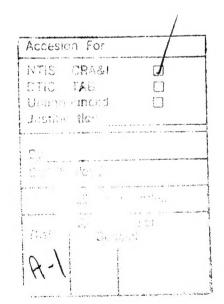


Rocky Mountain Arsenal Information Center Commerce City, Colorado



60% Design Cost Estimate Interim Action Rocky Mountain Arsenal Basin F



U.S. Army Corps of Engineers
Omaha District
Omaha Nebraska

August, 1987

Woodward-Clyde Consultants



In Association with HDR Infrastructure, Inc.
Consulting Engineers, Geologists and Environmental Scientists
Stanford Place 3, Suite 1000
4582 South Ulster Street Parkway
Denver, Colorado 80237
(303) 694-2770

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

Davis Highway, Suite 1204, Arington, VA 22202-1307. 1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AN	D DATES CO	OVERED
	08/00/87		5. FUNDIN	G NUMBERS
4. TITLE AND SUBTITLE 60% DESIGN COST ESTIMATE INTER	IM ACTION, ROCKY MOUNTAIN	ARSENAL, BASIN		
6. AUTHOR(S)			İ	
			2 252501	RMING ORGANIZATION
7. PERFORMING ORGANIZATION NAME	(S) AND ADDRESS(ES)	÷ (REPOR'	T NUMBER
WOODWARD-CLYDE CONSULTANTS OMAHA, NE			8	7289R01
9. SPONSORING/MONITORING AGENCY	(NAME(S) AND ADDRESS(ES)	10. SPONS	SORING/MONITORING CY REPORT NUMBER
ARMY CORPS OF ENGINEERS. OMAHA			AGEN	CA KEBOKI MOMBEN
DENVER, CO				·
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STA	TERRENT		12b. DIST	TRIBUTION CODE
APPROVED FOR PUBLIC RE	LEASE; DISTRIBUTION	I IS UNLIMITED		
13. ABSTRACT (Maximum 200 words)				
COST ESTIMATES FOR 1. RIP-RAP REMOVA: 2. GRADING				
3. CLAY FOR CAPPI				
4. WASTE PILE SEL 5. TOPSOIL 6. SUMPS AND PIPI	*			
7. DEBRIS REMOVAL 8. HAULING WASTE				
9. SOLIDIFICATION 10. ROADS		\odot		
11. FILTER 12. DRAINAGE NET.				
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14. SUBJECT TERMS	-			15. NUMBER OF PAGES
LINERS, SOLIDIFICATION, TRANS	PORT, COST			16. PRICE CODE
17. SECURITY CLASSIFICATION 18 OF REPORT UNCLASSIFIED	. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASS OF ABSTRACT	SIFICATION	20. LIMITATION OF ABSTRACT

STAGE ONE CONSTRUCTION			
REMOVE RIP RAP (SO. END)	6,250 C.Y.	\$5.50	\$34,375.00
REGRADE SOUTH BERM	32,250 C.Y.		\$85,785.00
HAUL SLUDGE TO STOCKPILE	91,370 C.Y.		\$243,044.20
CLAY CAP (2 FT.)	48,070 C.Y.		\$330,240.90
		SUBTOTAL	\$693,445.10
			30,3,443.10
LANDFILL CONSTRUCTION			
EXTERIOR BERMS	20,200 C.Y.	\$7.34	\$148,268.00
CLAY LINER-BOTTON (2 FT.)	43,300 C.Y.		\$317,822.00
CLAY LINER-TOPESIDES (2 FT.)	51,970 C.Y.		\$560,236.60
INTERNAL GRADING	48,600 C.Y.		\$129,276.00
SELECT FILL (2 FT.)	56,760 C.Y.		\$430,808.40
TOP SOIL (6 IN.)	13,000 C.Y.		\$38,090.00
DRAINAGE NET(3 LAYERS)	1,986,410 S.F.	\$0.35	\$695,243.50
SYNTHETIC LINER(2 LAYERS)	1,307,160 S.F.		\$1,045,728.00
GEOTEXTILE FABRICS(3 LAYERS)	1,986,410 S.F.	\$0.25	\$496,602.50
SUMPS AND PIPING	1 L.S.	\$36,120.00	\$36,120.00
		SUBTOTAL	\$3,898,195.00
NORTH LAGOON '(8.5 M GAL)			
EXCAVATION	54,000 C.Y.	\$2.66	\$143,640.00
CLAY LINER (2 FT.)	11,000 C.Y.	\$7.34	\$80,740.00
SYNTHETIC LINER(2 LAYERS)	296,600 S.F.		\$237,280.00
DRAINAGE NET(1 LAYER)	148,300 S.F.	\$0.35	\$51,905.00
		SUBTOTAL	\$513,565.00
LEACHATE LAGOON (1.5 M GAL)			
EXCAVATION	10,000 C.Y.	49.77	
CLAY LINER (2 FT.)			\$26,600.00
SYNTHETIC LINER(2 LAYERS)	3,750 C.Y.		\$27,525.00
DRAINAGE NET(1 LAYER)	101,250 S.F.		\$81,000.00
THE REPORT OF THE PARTY	50,625 S.F.		\$17,718.75
		SUBTOTAL	\$152,843.75
LIQUID REMOVAL			
PUMPS AND APPURTENANCES	1 L.S.	\$63,192.00	847 102 00
FORCE MAIN	1 L.S.		\$63,192.00 \$298,617.00
ELECTRICAL	1 L.S.	\$18,514.00	\$18,514.00
0 & M	600 HRS	\$13.76	\$8,256.00
	4*	SUBTOTAL	\$388,579.00
	_		0300,317100
CONTAMINATED MATERIAL REMOVAL			
REHOVE RIP RAP	18,750 C.Y.	\$5.50	\$103,125.00
REHOVE SEVER AND HISC.	15,000 C.Y.	\$4.88	\$73,200.00
NAUL WASTE TO SOLIDIFICATION	337,540 C.Y.	\$4.08	\$1,377,163.20
MAUL TO WASTE PILE	337,540 C.Y.	84.32	\$1,458,172.80
	•	SUBTOTAL	\$3,011,661.00
en interestou			
SOLIDIFICATION		1112 200	
FACILITIES CONSTRUCTION	1 L.S.	\$442,344.00	\$442,344.00
EQUIPMENT	1 L.S.	\$730,572.00	\$730,572.00
ELECTRICAL ELECTRICAL POWER	1 L.S.	\$178,752.00	\$178,752.00
	1 L.S.	\$71,400.00	\$71,400.00
FLY ASH	. 40,000 C.Y.	\$28.70	\$1,148,000.00

0 & H	1 L.S.	\$1,197,566.00	\$1,197,566.00	
ADDITIONAL CHEMICALS	1 L.S.	\$4,670.00	\$4,670. 00	
		SUBTOTAL	\$3,773,304.00	
ITE IMPROVEMENTS			,	
ROADWAYS (25 FT.) LEVEL B	4,167 C.Y.	\$11.33	\$47,212.11	
ROADWAYS (25 FT.) LEVEL D	2,315 C.Y.	\$9.89	\$22,895.35	
SIGNING	1 L.S.	\$10,000.00	\$10,000.00	
FENCING (6' W/ 3 BARBS)	6,000 L.F.	\$12.00	\$72,000.00	
		SUBTOTAL	\$152,107.46	
JNOFF/DUST CONTROL				
PUMPING	1 L.S.	\$50,000.00	\$50,000.00	
DIKES	25,000 L.F.		\$25,000.00	
DUST CONTROL	1 L.S.		\$50,000.00	
		SUBTOTAL	\$125,000.00	
EACHATE/BLOWDOWN LIQUID HANDLING				
TRANSPORT TO LAGOONS	1,500,000 GAL.	* \$0.10	\$150,000.00	
		SUBTOTAL	\$150,000.00	
QUIPMENT DECONTAMINATION				
SOLIDIFICATION FACILITY	1 L.S.	#2F 000 00	405 400 00	
LAGOONS	2 EA.		\$25,000.00	
PUMP STATION AND FORCE MAIN	1 L.S.		\$20,000.00	
DECON AREA & MISC.	1 L.S.		\$7,500 .00 \$7,500 .00	
		SUBTOTAL	\$60,000.00	
ASIN CAPPING/TOPSOILING				
GRADE AND SHAPE	224,500 C.Y.	*3 44	4507 470 00	,
CLAY CAP (2 FT.)	215,160 C.Y		\$597,170.00	
TOP SOIL (6 IN.)	73,880 C.Y.	\$6.87 \$2.93	\$1,478,149.20	
SEEDING	510,000 s.y.		\$216,468.40 \$76,500.00	
	2.0,000 3.1.	SUBTOTAL	\$2,368,287.60	
		TOTAL	\$15,286,987.91	
	102	CONTINGENCY	\$1,528,698.79	
		MOBILIZATION	\$764,349.40	
		COST GTH HOPT	\$611,479.52	
		SUPERVISION	\$1,070,089.15	
		0 & P	\$1,834,438.55	
a, ~			=======================================	
		GRAND TOTAL	\$21,096,043.32	

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Subject <u>Basial</u>	F 60% COST ESTIMATE	Project No. <u>86 C8554 P</u>
By D. HAWK	Checked By Ton Killy	Task No.
		File No. <u>21947</u>
Date 7/7/87	Date 7/1:/87	Sheet/_ of2
STAGE O	ONE CONSTRUCTION	
	MOVE MATERIAL ON SOUTH	END OF BASIN AND
	WASTE PRE AND SOLIDIFIC	CATTALL FACILITY.
	· Remove RIP RAP So	OUTH END
		1(25,000 CY) = 6250 CY
	UNIT PRICE = #5 (See Cost 1	550/cy/
	(See Cost 1	17EM 1)
	· 1	y x 55 /cy = #34,375/
	LBST - 6250 E	y x 5 - /ey = 37,3/5 ·
	· Regrode South Be	rm
	QUANTITY = 14	(129,000 CY) = 32,250 CY TOTAL BASIN F BERM QUANTING
		1
	UNIT PRICE = A (SEE COST)	2 0 / 0 4
	(SEE COST	(TEM 2)
	Cas = 32 75c	CY = \$266 /c4 = \$85.785
	· Haul Sludge to	Stockpile
	QUANTITY = 91	370 847
	UNIT PRICE = "	2 6 /cy
	Cost = 91,370	cy x 2 6 /cy = 4243, 044 20
	(See Cot 19	
	· Place Clay Cap for	Busin
	QUANTITY = 91,	370-43,300 = 48,070 CY
	(TOTAL STAGE / A	REA - AREA OF LANDFILL
	USIN4 2 FT 77	
	#18	37 / 1 / C / 1 250

		15/1/ F						Project No			7 '
	D.H.	AWK		cked By				File No.			7
to.	7/2	1/87	Dat	te 7/13	197			Sheet			
1 <u>C</u>	1	/ - /	<i>D</i> a		1	ı		W11061			
	•							•			
		•	Place	Clay	Cap	for	Basil	5 F	(con;	tinuea	()
										1	
	4		17	EM 3	= 2	45	104			1	
	termina de la collectión de la collectió		1 .	1					•		
			7	OTA L	= 6	3/	cy!				
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		<u> </u>	Ca	57 =	48 0	70	CYX	6 37/0	4 = 4	330.2	40
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bject <u>BA</u>	SINF 6	10% COST				86 C85	554
D. HA	TALK	Checked Rv	Tom Kelley	-		2	
			//		File No	21947	7
te $7/7/8$	37	Date 7/15	167		Sheet	of	3
				-	1		
	LANDFILL	Pariste	- 7/05/			:	
	CANDRICE	CONGRE	12/1014				
		EXTERIOR	BERM.	PONSTRUC	TION .		
		QUANT	17y = 2	0,200 0	9		
		//	PRICE = "	7734/	4/500	COST /TE	ns 2
		UNI				CUS/ 1/E/	رران
			17em 3 17em 5	= 4442	104	,	
			17em 5	= \$292	104		
	and the second of the second o		TOTAL	1			
			TOTAL	= 7-,	109	other configuration	
		1-0-	= 20,2	 	# 34/	2u = 142	268
The section of the se	.		- 20,20	JU 47	- / /	7 (10)	2 90
	-		1	1	1		
	•	CLAY L.	WER - BO	TOM	<u> </u>		
	i , ,	QUAN:	7774 = 4	3,300 0	Y		
			PRICE =	734 %	4/-	0- 1-	
		UNIT. F	RICE	1-10	J C.See	LOST /78	75 3°.
-	:		1mm 3-	142	64	the state of the s	
		i	1 men 3 -	\$ 92	ley	•	
							
			TOTAL	= 4734	104		
				4-2	34	- #210	
		Cosr	= 43,300	ocyx 1-	-104	31/18	22
		P. 111	VER - 75	2-10	. 5		
		CL44 -1)	AND	-1265	a distribution of the second o	
		QUART	174 = 5	1,9700	24		
							. 1
		UNIT	PRICE =	10 6/cy	1 (See	COST /TEM	6)
					78 /	8	, 60
1		Cost	51,970	cy × /	0-104=	560,23	ص
				 			
					1: 1		
				 		<u>-</u>	

	D. HAWK	Checked By	Task No
Date	7/7/87	Date 7/13/87	Sheet of 3
		INTERNAL CRADING WANTITY = 48,600	cy/
			$\frac{1}{2}\frac{64}{64} = \frac{61}{129,276}$
		PLACE SELECT FILL (SO	
		DAIT PRICE = 4757/	y (See COST Tems 7 4 8)
			81/cy/
			\$759/e7 = \$4/30, 80840)
		TOPSOIL QUANTITY = 13,000	CY
		UNIT PRICE = 2 13/0	y (See Cost Hem 9)
		Cost = 13,000 C4	×#25/cy = \$38,09000
		DRAINAGE NET QUANTITY = 1,986,5	
			/SF (See Cost ITEM 10) F x #035 = 4695,24350-

Subjec	t BASIN F	60% COST ESTIMATE	Project No. <u>86 C8559</u>
3y Z	D. HAWK	Checked By Torr Villey	Task No
ate	7/8/87	Date 7/1/87	Sheet 3 of 3
	1		
		· SYNTHETIC LINER	
		QUANTITY = 1,307,160	
		UNIT PRICE = 0 30/5	F (See Cost I tem 10)
		COST = 1,307,160 SF.	× 4030/SF = 41,045,728
			The state of the s
		· GEOTEXTILE FABRIC	
		QUANTITY = 1,986,41	0 SF /
_		· •	
		UNIT PRICE = # 025/	
		COST = 1,986,410 SI	F x 40 25/5F = 496,602
		· SUMPS AND PIPING	
		Lump Sum = #36,1	20 (See Cost Item 11)
			and the same of th
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		+ + + + + + + + + + + + + + + + + + + +	
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nplect "	BASIN F	60% COST ESTIMATE	_ Project No. <u>86 C8 SS4 F</u>
v D	Howk	Checked By Tom Kalle	Task No. 2
		O C	File No
ite 1	7/8/87	Date 7/12/87	Sheet of
			and the state of t
		LAGOON CONSTRUCTION	
	YORTI	CACOON CONSTILLOCITOR	
+-		· EXCAVATION	
		QUANTITY = 54,00	
		UNIT PRICE = #29	66/cy (See Cost I tem 2)
		COST = 54,000	CY x 26/cy = 4143,640°
		· CLAY LINER (Z FT.)	
–		QUANTITY = 2 x 148	300 SF = 27 CF = 10,985
			29
			SAY 11,000 C,
		11. 0 = - 7734	Tay (See Cost Items 3 ? 5)
	1 .		
		17em 3	= A 4 42/cy/
		17em 3	= 42 92/cy/
			į
			= *734/cy
		C 25 - 1/200 CY	x 47 34 /c4 = 80,740
			101
-			
		· SYNTHETIC LINER (2 LAYERS)
		QUANTITY = 2 x	148,300 SF = 296 600 SF
		UNIT PRICE = #0	3%= (see Cost /tem 10
		Cost = 296 600 SF	x 0 30/sF = 237,280
			-
		+++++++++++++++++++++++++++++++++++++++	
		+ + + + + + + + + + + + + + + + + + + +	• • •

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				1	QUP,	17.17.4	300	148,3	300	SFI		
		-		1 ;							<i>n</i> .	. /
				 	UNIT	PR	CE	= 0=	-/5	= (5ee	Los	t Item
		-			C057	<i>-</i> =	148	,300	: SF X	NO 35	/s= =	#5190
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Subject BASIN F 60% COST ESTIMATE Project No. 86 C 8554P Task No.____ @__ By D. HAWK Checked By Tom Kelley Date 7/9/87 Date 7/13/87 Sheet of (

LEACHATE LAGOON CONSTRUCTION

· EXCAVATION

QUANTITY = 10,000 CY UNIT PRICE = #266/CY (See Cost Hem 2) COST = #26,6000/

· CLAY LINER

QUANTITY = 59625 SF & Z FT + 27 CF = 3750 CY/

UNIT PRICE = 7 1/cy (See Cost Hem 3 55)

Item 3 = 44 42/cy/ Item 5 = 52 92/cy/

TOTAL = #734/cy/

Cost = 3750 c4 x 734 64 = \$27.52500/

· SYNTHETIC LINER (2 LAYERS)

QUANTITY = 2 = 50,625 SF = 101,250 SF

UNIT PRICE = FORD/SF (See Cost Hem 10)

Cost = 101,250 SF x 0 30/SF = \$81,000

· DRAINAGE NOT (1 LAYER)

QUANTITY = 50,625 SF.

UNIT PRICE = "035/SF (See Cost Hem 10)

Cost = 50,625 SF x # 6 35/SF = 97,7/8 75

Subject BASIN F 60% COST ESTIMATE Project No. 86 C8554P Checked By Tim. Kelly Task No.____ By D. HAWK File No. 2/947 7/13/87 Date 7/9/87 Sheet ____ / of Date LIQUID ROMOVAL SYSTEM (See Cost Hem 12) · Pumps AND APPURTENANCES 4966300/ WATER 4393 = / GONCRUTE SLABS #164500/ GUARDRAILS 19,822 00/ AIR SOPPLY SYSTEM 27,66820 PUMPS Torac \$63,19200/ · FORCE MAIN 148,857 LABOR 148,748 MATERIAL 1012 EQUIPMENT TOTAL \$298,617 00 · ELECTRICAL

> 15,672 BEANCH TO COMPRESSOR PAD LIGHTING TO COMPESSOR PAD 2842 TOTAL 18,51400

. 0 5 M 600 HRS × 41375/HR = 4825600

Subject BASIN F 60% COST ESTEMATE Project No. 86 C8554P Task No._ By D. HAWK Checked By TCK File No. ____2/947 Date 7/9/87 Date 7/13/87 Sheet _____ of 2

CONTAMINATED MATERIAL REMOVAL

· REMOVE RIP RAP QUANTITY = 25,000 CY = 3/4 = 18,750 CY UNIT PRICE = \$550/cy (see Cost Hem 1)/ Cost = 18,750 Cy x 5 = /c4 = \$103,12500

· REMOVE SOURCE AND MISCELLANEOUS DEBRIS QUANTITY = 12,000 CY x 1.25 = 15,000 CYX (12,000 CY FROM CLOSURE PLAN, BASIN F ROCKY MOUNTAIN ARSENAL, EBASCO, DECEMBER, 1985 WITH 25% CONTINGENCY) UNIT PRICE = 44 88/CY (See Cost HEMS 13 ; N) Cost Hem 13 = 4 08/64 Cost Hem 14 = 40 80/c4 TOTAL = 4 58/04 Cost = 15,000 CY x 4 88/cy = \$73,200)

· HAUL WASTE TO SOUDIFICATION QUANTITY = 362,540 CY - 25,000 CY= = 337,540 CY - RIP-RAP UNIT PRICE = 408/cy (See Cost Hem 13) Cost = 337,540 Cy x 1/08 Cy = 41,377,143 20

Subject BASIN F	60% COST ESTIMATE	Project No. 86 C8554P
By D. Hawk	Checked By Tom kelle	Task No. 2
		File No
Date 7/10/87	Date 7/13/87	Sheet 2 of 2

· HAUL WASTE TO WASTE PILE QUANTITY = 337,540 CY Unit PRICE = 4 32 (See Cost Hems 14 : 15) Item 14 = 4082/c4V Item 15 = 438/c4V TOTAL = \$432/cy Cost = 337,540 cy x 4 32/cy=41,458,172 80 Subject BASIN F 60% Cost Estimate Project No. 86C8554P Task No.____ Checked By Tinkelly By D. HAWK File No. 21947 7/13/07 7/10/87 Date SOLIDIFICATION (See Cost Item 16) · FACILITIES CONSTRUCTION 195950 WOOD WALL 119,511 00 SITE WORK CONCRETE SLAB TOTAL \$442,34400) EQUIPMENT 128,00000/ FLY ANN TANKS 4485,69800 PUG MILLS 22,56000/ DUST CONTROL SYSTEM ¥ 94,314°°/ AMMONIA SCENEBER SYSTEM TOTAL \$730,57200 # #178,752= */ · ELECTRICAL # 71,400 00 H ELECTRICAL POWER # 1,148,0000 · FLY ASH . 0 : M 459,70200 Man Power 4 738, 36400 EQUIPMENT A 1,197,56600 * TOTAL · ADDITIONAL CHEMICALS Hz SO4 Na Clo 3800° 36000 Na OH \$ 467000

Subject BASIN F 60% COST ESTIMATE Project No. <u>86 C855%</u> Task No.____ Checked By Ton Kell By D. HAWK Date 7/10/87 Date 7/13/27 SITE IMPROVE MENTS · ROADWAYS (LEVEL B) QUANTITY = 9000 FT x 25FT x 0.5FT +27CF = 4167 cy UNIT PRICE = 1/32 Ky (See Cost Item 19) Cost - 4167 x 113/cy = 47,2124/ · ROADWAYS (LEVEL D) QUANTITY = 5000 FT × 25 FT × 0.5 FT + 27 CF = 2315 04/ UNIT PRICE = #9 89 /cy (See Cost Hem 18) Cost = 2315 cy = 987/ey = #22,895 35/ · SIGNING QUANTITY = 50 signs (estimated) UNIT PRICE = 200/SILN (estimated) 3 k. Cost = 50 x 200/sign = \$10,000 00 V · FENCING QUANTITY = 6000 LF (estimated) o.k. UNIT PRICE = "12 =/L= (1987 METRUS 2.7-090-0600 6' high aluminized steel w/3 banks = "15" KF SAY 41200/LF Cost = 6000 LF x 1200/LF = 472,0000

Subject BASIN F 60% COST ESTIMATE Project No. 86CB 554P Task No.____ D. HAWK Checked By T. Kill File No. ____ 7/10/87 7/17/87 Sheet _____ of ____ Date RUNOFF DUST CONTROL · PUMPING QUANTITY = 5,000,000 gallons (estimated) Unit Price = "00/gallon From MEANS 1987 2.3-100-0800 8 hrs attended 2" diaphragm pump Say averages 50 gpm & 8 hrs/day 50 gal/min × 60 min × 8 hr = 24,000 gal PRICE = 2630/DMY UNIT PRICE = 263 - 10 my = 24,000 goldeny = 400 /6AL O.A. COST = 5,000,000 gal. x 0 0/gal = \$50,000 / · DIKES QUANTITY = 25,000 LF (ESTMATED) O.K. UNIT PRICE = \$100/LF (ESTIMATED) O.K. Cost = 25,000 4 × 100/4 = 25,000 - DUST CONTROL COST = 30,0000 (ESTIMATED) C.A.

Subject <u>BASIN</u> F By D. Hawk Date 7/10/87	1 /	Project No. <u>86C8SS/P</u> Task No. <u>21947</u> Sheet of
	BLOW DOWN LIQUID HI	GNOLING
	· TRANSPORT TO LAGOOM	25
	QUARTITY = 1,500 (Volum	of pond
	UNIT PRICE = 0	1º/gallon.

(Use 4,000,000 gal = 388,579 4 10/gallo.

Cost = 1,500,000 gal x 010/gal = 4,50,000

Woodward-Clyde Consultants

Subject Basin F	60% COST ESTIMATE	Project No. 86 C8554P
•		Task No. 2
		File No. 2/947
Date 7/10/87	Date 7/1:/97	Sheet of

EquiPMENT DECONTAMINATION

Subject BASIN F 60% COST ESTIMATE Project No. 86CBSSYP Checked By Tom Kelle Task No. By D. HAWK Date 7/10/87 Date 7/13/87 Sheet _____ of__

BASIN CAPPING /TOPSOILING

· GEADE AND SHAPE

QUANTITY = 224,500 CY (256,750 - 32,250 (STAGE 1)) UNIT PRICE = 2 1/64 (See Cost /tem2) Cost = 224,500 cy x 26/64 = 597.170 00

· CLAY CAP (ZFT)

QUANTITY = 306,530-48,070-43,300 CA (BASIN F PROPEZ - STAGE / CAP-WASTE PILE CAP)

UNIT Perco = \$687/c4 (See Cost Hems 394) Hem 3= 4/42/cy/ TOTAL = \$6 57/c4

Cost = 215,160 CY x 687/cy = 7,478,14929

· TOPSOL

QUANTITY = 73,880 CY 0.k. UNIT PRICE = 92 12/cy (See Cost I tem 9) Cost = 73,880 CY x 23/64 = 216,468 40

Date 7/10/87 Date 7/13/87 Sheet 2 of 2 - SEEDING - SE	Subject Basin F	LOS COST ESTIMATE	Project No. 86 C8554P
Date $7/10/87$ Date $3/13/97$ Sheet $3/19/97$ • SEEDING QUANTITY = $5/0,000$ SY. (105 Acre × 43,560 ÷ 9 = $508,200$ SY. UNIT PRICE = $5/5$ SY. (1750 = ACRE ÷ 45,520 × 9 = $5/5$ SY.	By D. Howk	Checked By Ton-Kell	
• SEEDING QUANTITY = 5/0,000 SY. (105 Acre × 43,560 ÷ 9 = 508,200 S) UNIT PRICE = \$0 15 / SY (*750 16 / ACRE ÷ 43,520 × 9 = 65/54)			The state of the s
QUANTITY = 5/0,000 54. (105 Acre × 43,560 ÷ 9 = 508,200 s) UNIT PRICE = \$0 15 /54 (*750 \$ /ACRE ÷ 43,520 × 9 = \$0 5/54	Date 7/10/87	Date 7/13/87	Sheet of
QUANTITY = 5/0,000 54. (105 Acre × 43,560 ÷ 9 = 508,200 s) UNIT PRICE = \$0 15 /54 (*750 \$ /ACRE ÷ 43,520 × 9 = \$0 5/54			
QUANTITY = 5/0,000 54. (105 Acre × 43,560 ÷ 9 = 508,200 s) UNIT PRICE = \$0 15 /54 0.k. (*750 \$ /ACRE ÷ 43,520 × 9 = \$0 5/54			
QUANTITY = 5/0,000 54. (105 Acre × 43,560 ÷ 9 = 508,200 s) UNIT PRICE = \$0 15 /54 (*750 \$ /ACRE ÷ 43,520 × 9 = \$0 5/54		· Seenul	
UNIT PRICE = \$0 15 /54 0.k.			0.K.
UNIT PRICE = \$0 15 /54 0.k.		QUANTITY = 5/0,00	00 54. * 43.560 = 9 = 508 7050 87
		UNIT PRICE = D	= 154 = 1xes = 48470 = 9= 40= 6x
Cost = 5/0,000 SY x 0-1/SY = 776,500=			
		Cost = 5/0,000 sy	x 0-/sy=976,500



Project RMA-Paris F-WWC Computed There Subject Garage to tice 7 7 Shr Of

1) Exercate For Wastepile & Solidizionation Anca 810 x 850 = 488,500 S.F. x2 5+/27 = 51,000 C.Y. 150x 300 = 45,000 S.F. x 25x/22 = 3,333 C.Y. = 37,037 C.Y. 500' 500'x 1,000x2/27 91,370 C.Y.

2) Wastepile Bern 2(755+805)=3,126 L.F. 5x20+5x15. 175 5.F. (3,126)(175)/27= 20,222 C.Y

544 20, 200 CY slipe yardage 3) Clay Blanket for Wastepile &

HOX790 4' (110%) /27 = 95,7 BOTTOM = 140 × 790 × 2 FT/27 = 43,300 cy TOP \$51065 = 95,270 cy = 43,300 = 51,970 cy 95, 268 C. Y. SAY 95,2

[95 A. (43,560) - (7402790)] 2/27= 300,530

5) Topsoil Son Mostepile (740x790) 0.5' (120%)/27 = 12,991 C.Y. SAY 13000 (

(e) Topsoil For Bosic "F" Proper [105A. LA3, 560) - L740x790)]0.5/27= 73,874 C.Y.

7) Excesse For Book F' (Entire Site icel. mastepile) 342,542 C.Y.

8) Grading For Basic F' C-2256, 744C.Y. 544 256,750 CY E- 5-11, 5-08 - 50, 555 - 522 de C. X. 1 1

7) Internal Conding (WASTE PILE) (700'x750 x 5/2)27 - 48,411 C.Y. SAY 48,600 CY

10) Select F: [1 (WASTE PILE) (510×800×2/27) 110% = 54,740 C.Y

11) Stage One Bern Removal /A Bern V.l. (129,000) = 32,250 cy

ad 42

85,600 C.Y.

= 315,500 C.Y. 11:3

Cut Livel. Born) = 154,000 C.Y.



Subject Fluid Quantities Date 15/27 Shr. Of 1

Morth Pal

Avec = 870, cell = .F.

Ave. Depthe 0.33 24. (back on into in 230c+86

letter of Holme Roberts i Owen

Vol. = (870, cell (0.33) (7.481) = 2, 149, 303 gel.

Southwest Pool

Anen- 114,510-193= 114,317 3.F.

Ane. Depthe 0.23 54. (book on 23 Oct 84 letter

Vol.= 114,317 (0.23) (7.481)= 200,139 gol.

Southern Pool

Area = 139,741 3.F.

Are. Depth= 0.45 \$t. (boned on 23 Oct 86 letter)

Val. = 139,741 (0.43)(7.481) = 470,431 gal.

2 S.E. P. .. 13

A-ca= 7,451+5,814=13,245 =. F. Ave. Depthe D.1 9.4. (coonmed) Vol. = 13,245(D.1) (7.481) = 9,923 gal.

Total Vol. = 2,829, 794 gal. 00 04 10/25/84

Subject / WER QUANTITY Project No. 86C8547 Task No. By D. Howk Checked By ROG File No. __ 2/947 3/21/87 Sheet _____ of __/ Date LANDFILL 500 × 550 = 275,000 SF × 102 = 280,52 TOP AREA 143.7' × 2720LF = 390,930 SF x 1.02 = 398,75. 810 × 760 = 615,600 SF × 1.02 = 627,90 SIDE AREA BOTTOM AREA 1,307,1605 DRANKE NETS = 627,910 × 1 1 BOTTOM 627,910 Z VOPS = Z × 280 500 Z SIDES = Z × 398,750 561,000 797,500 1,986,40: SYNTHETIC LINERS 1. Bottom
1 SIDE } See above 1,307,160 SF GESTERTILE NETS 1 BOTTOM } 2 TOPS } SEE DRAINAGE NETS 1,986,410 2 SIDS

	ct <u>LXCAVATIO</u> D. Hawk	Checked By T. Kill	Project No. <u>86 C 855</u> Task No. <u> </u>
	7/8/87	Date 7/1:/87	File No
ate	1/0/0/	Date	OHIGH WILLIAM
-			
	NORT.	4 LAGOON QUANTITY FOR	EXCAVATION
		FROM DESIGN DIMENS	
		310 @ BOTTOM 382 @ TOP	12' deep
		VOLUME	
-	raj en readi di di	310°+382° ×	$12' \div 27 \frac{cF}{cY} = 53,783$
		[3/c + 382]2 /12	
-		5AY 54,000 C	$\frac{1}{2} = \frac{1}{2} \cdot 3 \cdot \frac{20 \tau_{\text{cy}}}{2}$
-•·		37,000.	
_	:		
		AREA	namental de la companya del la companya de la companya de la comp
			* \(\int 12^2 + 36^2 \) + 310 = 389
		AREA = (385')2	= 148, 225 3F
			SAY 148, 300 SF O.K.
:		582	
			3
		316'-	

, D. H.		Checked By	ATE LAC		Project No Task No	<u>86 C855</u> ==
			//	ı	File No.	21947
ate 7/9/	87	Date 7/	12/87		Sheet	
			, ,		}	terretain the second se
		!				
	LEACHATE	LACOON	(1.5 milli	nn galls	115)	1
	7. 10.11.0			0		
			200'			
a an authorise trans or an extension to				 		
		100			* ¥	
		 	120'			
					•	
				-	•	
as any distribution of the state of the stat	a)	Areu	of Liner	(Use	. 225' W	/ Berms)
ura e apater e de es			•			
		22	5' × 225	= 50	,625 SF	• /
	В	Volume	of exca	untion :		. :
an de la republicación de la religio e deliminación						
		(20	0 FT) ² +	(120	FT) X 10	FT + 27 C
				\ Z==-	+120,72-17	م = د
		=	10,074	cy 9	51700000	· * .
			1	<u> </u>		* *
		SA	1 10,00	0 CY	0.1.	• •
<u> </u>	, ,					
1 1	3					
	; .					
1	i					1
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	·					
					1	-, -
				<u> </u>		



Project

Computed

Date - 3- Sht. Of

5) Area of Excevation Balow E1. 5188 (Clay Cap would be part of F:11) = 60 A.

Vol. . 43,540 x2/27= 190,000 C.Y.

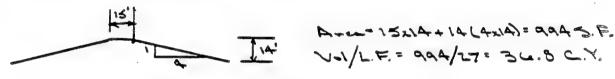
(a) Cover (Site Mt). For Topesil)

Area 11.0 A.

Assume 19t. Leptur

Vol= 110 (43,560(1)/27 = 177,500 C.Y.

7) Monstepile Bern Qty 28' ht. pile (25' monte + 3' cover) >> 12 A. inquere Bern Longon = 723' + 7' = 730'



V.1. = 34.8 (4x730) = 107,500 C.Y.

8) Qty Warte Cinel Rig-Rep) 393,300 C.Y.

9) <u>Cly Cop</u> 93.5 A. - 3.5 A. - 12: A ÷ 78 A. 78 x 2 x 43,560/27 = 7.51,500 C.Y.

						C	he by eur
	Project				Computed		\
****	Subject			ø	Date 1/27	/57 Shr.	Of
	1) Rie	Rup	2+x				
	A.	22 w me	8"-18"	حوزيو ک	> 24 = + 4/6	te mess	· ·
		5200				~ 3	
SP			51		3190	41.	> 200' E. Bu
	11.5" x(1	57.71/17.78	'x 51' x	ر 'دکی دی)= 8,155 0	Ľ. ∀.	
		25.	5'	,5195		Besi	- 1-1
	19" x (18	בג (ייו/ייד.ד	'x Z5.5'	((/27) =	4,735 C	.~.	
	7" x (197.7	71/1" > メン	x 95' L	Y27) = 0	,245 C.Y.	Ea	+ 5:de
				(m) = 200	,135 C.Y.		- <u>24"</u> mide
2) Bern	Dry	- Company of the Comp				
	Faram	CABB		Vol. = 8	5,400 C.	٧.	
=	11:7 C	BT	- Allino				
	F	CAR	>	Vol. = 3	15,500 C		

4) Cut Linel Beam)

F ... CABE Vol. - 154,000 C.Y.

Rip Rap Removal Operation

Subject CANTEMINA	TEO KIP RAY REMOVAL	Project No. <u>86C8554</u>
		Task No
IV D. Amue	Checked By	File No. 2/947
ate 1/23/87	Date 1/16/57	Sheet of
		
KIP KAH	REMOVAL UNIT RATES	DAILY RATE
1)	DOZER 300 HP	\$ 898 00
•		- 3
2)	FRONT END LOADER 225 CH	432 20
3)	2 Equip DREATOR C.	166 352
Ass	JUNE 7 - 12 90 LORDS / MR	
. ,	= 100 Cy	
	EUME 7-1290 LORDS/HR = 100 Cy 28 Hz = 800 CY	
か	3 1240 END DUMPS	2 2/0 009
5)	3 TRUCE OPERATORS	@ 1350 40680
•		22:25
		2903 0x
	44	
	72900 / =	43 = /04
	\$2900 /800 cy =	
	,	
	W/ SAFETY @ 50% =	4/82/04
	4 211 51 6 251	
		# - 40 / 4-5
	TORC	\$540/cy 344555
	••••	
		·
		•
•		
	=	

	EW AND PRODUC			A C F	DATE PREPAR	
LOGATION DENVER		·		D. HAW CHECKED BY Tom Kel	K.	CREW REF NO
DENVER	, 🐼	CRFW	COMPOSITION	1 10m Kel	(/	·
WORK TYPE EXCANTION /HANLING	WORK SCHEDUL			SPECIAL INFORM	ATION RIP RADOCHPILE OR WI	
			LA	BOR COST		ENT COST
CREW DESCRI	PTION	NO. REQUIRED IN CREW	MOURING	TOTAL FOR CREW (S/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (S/MR)
CAT DOL T	DOZER	1.	16 88	1688	106 37	10637
CAT 966 D	LOADER	1	16 88	16 88	61.10	616
12 CY END Dum	TANDEM AXL	3	1678	50 34	37 50	11190
TOTALS	MANHOURS	5	LABOR COST	8410	EQUIPMENT	279 37
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
EXEMPTION / HAVEING	98 cy/HR		10 86/ey	4285/cy		·
SAFETY				1 95/cy		•
TOTAL EQUIMENT, LABOR & SAFETY				->	USE "55 IN PREL.	ley 2 Vey as o.k. Serimente
* Including frings benefits						•

C

	CREW AND PRODUCT this form, see TM 5-800-			ACE.	5/2/8°	PEE 7
PROJECT	•			D. HAWK		CREW REF NO
LOCATION	٤, ٥	•		CHECKED BY	Oly,	
			COMPOSITION			
WORK TYPE SAFETY	WORK SCHEDULE	I .		HAUL TO STO	ation Rip Ra Lk Pile or U	P REMOVAL UASTE ALE
			LA	BOR COST		ENT COST
CREW DES	CRIPTION	NO. REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (\$/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/MR)
HEAVY EQU	IPMENT	5			38 20	19100
	•	·				
			.,			
						A AN ARCHITECTURE (1)
			•			
,						
			LABOR			
TOTALS	MANHOURS		COST		EQUIPMENT COST	19100
			ODUCTIVITY			
work task	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT 8/UNIT	COMN	IENTS
SAFETY	98 cy/HR			# 125/cy		٠
					·	
			·			•
* Including fringe benefits		<u> </u>				

- Sludge Handling
 Stage 1 Stockpiling
 Regrade Berms
 Waste Pile Internal Grading
 North Lagoon Excavation
 Grade and Shape Basin F
 Leachate Lagoon Excavation
 Topsoil Grading

	W AND PRODUCT				DATE PREPAR	
PROJECT	form, see TM 5-800-2	the proponi	ent spency is USA	PREPARED BY	3-18	CREW REF NO
RMA				D. HAWK		CHEN HEP NO
LOCATION		•		CHECKED BY		1
DENVER, C	0.			T. Kelley	3/18/27	
		CREW	COMPOSITION			
WORK TYPE	WORK SCHEDULE			SPECIAL INFORMA		
EXCAVATION HAULING				STAGE 1	STOCKPILL	يا (بر
		NO.		OR COST		ENT COST
CREW DESCRIP	TION	REQUIRED IN CREW	HOURLY® RATE (S/HR)	FOR CREW (S/HR)	HOURLY RATE (\$/HR)	FOR CREW (\$/MR)
CAT 627 B	SCRAPERS	6	1703	102 18	1172	706 62
CAT DEL DO	2645	4	1688	6752	10637	425 48
CAT 144 MOTO	e grader	1	1703	1703	75 61	75 61
CAT D6 Do	egr.	1.	1688	16 88	4640	4.40
MRS 1-1005 TRAG	LTOR W/ DISC	1	1688	16 23	83 22	83 <u>ව</u>
LABORERS.		2	12 7/2	25 52		
CAT 627 B SOM	PERS (STANDBY)	1		******	7537	7537
·						
						1
TOTALS	MANHOURS	15	LABOR COST	24601	EQUIPMENT COST	141257
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT S/UNIT	СОММ	ENTS
EXCAVATION HAULING	870 cy/Hz		1020/cy	#162/cy		•
SAFETY	870 CY/HR		018/cy	"0 5 /cy		• .
TOTAL EQUIPMENT NITH LABOR & SAFETY					> 126	-/cy
	•					•
*Including fringe benefits						

CF	REW AND PRODUCT	IVITY WO	RKSHEET		DATE PREPAR	
	his form, see TM 5-800-2	: the propone	int epency is USA		1 3-18-	-87
PROJECT RMA				D. Hawk		CREW REF NO
LOCATION				CHECKED BY		
DENVER, C	0.			T. Kelle.	y 3-18-27	•
		CREW	COMPOSITION			
WORK TYPE EXCAVATION HANLING	WORK SCHEDULE			STAGE I	STOCKPIL	ing ing
			LAI	OR COST	EQUIPM	ENT COST
CREW DESCR	IPTION	NO. REQUIRED IN CREW	HOURLY* RATE (S/HR)	TOTAL FOR CREW (S/HR)	MOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
HEAVY EQUIP	MENT	13			3820	496 60
STANDBY HEAV	4 EquiPMENT	1			445	445
LABORERS		2	78°5	156 10		
			•			
			•			
			·			
TOTALS	MANHOURS		COST	15610	COST	50105
		CREW PR	ODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
· SAFETY	870 CY/HR		*0 18/cy	*0 58/cy		•
						•
	·					
	·					•
Including fringe benefits DA FORM 8419-R, Apr 85						

|--|--|

File No. 21947		STRUCTION - SLUD		
Swore HANDLING; costs to Stock PILE The work work will include excavating and having excavatinaterial from the solidification area and the landfillare outside the inner term; to the sludge stock pik area institle term where it will be disced and allowed to drain and dry. Dozers will be used to excavate material down to the liner and push load scropers. 2 additional objects will be used to excavate the material below the liner down to the finished grade. The scrapers will be used to have material to the sludge stockaile where a light obser will assist in moving material and a tractor with disc attachment will be used for discing and aeroting the material. A motor grader will be used to maintalin have roads to the stockaile and 2 laborers will be used as spotters. It was assumed that portions of the excavation or and sludge could have rolling resistances as high as 15% of the have would be on have rolling resistances. Thus, an average rolling with very low rolling resistance. Thus, an average rolling	y TEK	Checked By	D. HAUX	Task No. 2 File No. 2/947
The work work will include excavating and having excaval material from the solidification area and the land fill are butside the inner berm, to the sludge stockpik area ins the berm where it will be disced and allowed to drain an dry. Dozers will be used to excavate material down to the liner and push load scropers. 2 additional dozers will be used to excavate the material below the liner down to the finished grade. The scrapers will be used to have material to the sludge stockpile where a light dozer will assist in moving material and a tractor with disc attachment will be used for discing and aeroting the material. A motor grader will be used to maintalin have roads to the stockpile and 2 laborers will be used as spotters. It was assumed that partions of the excavation are and sludge could have rolling resistances as high as 15% and 100 to the law of the have would be an have rolling veristance. Thus, an average rolling with very low rolling resistance. Thus, an average rolling	ate 3/13/ 87	Date 3	118/87	Sheet/ of4_
Dozers will be used to excavate material down to the liner and push load scropers. 2 additional objects will be used to excavate the material below the liner down to the finished grouds. The scrapers will be used to have material to the sludge stockpile where a light object will assist in moving material and a tractor with disc attachment will be used for discing and aeroting the material. A motor grader will be used to maintalin have roads to the stockpile and 2 laborers will be used as spotters. It was assumed that partions of the excavation are and sludge could have rolling resistances as high as 15% of the that would be on have rolling very low rolling resistance. Thus, an average rolling	The work material from butside the the bern w	work will i on the solic inner bern	include excavation area	ting and having excave and the landfillar
disc attachment will be used for discing and aerating the material. A motor grader will be used to maintalin haul roads to the stockpile and 2 laborers will be used as spotters. It was assumed that pertions of the excavation and sludge could have rolling resistances as high as 15% of the haul would be on faul road with very low rolling resistance. Thus, an average rolling	Dozers where a used to enthe finished material t	reavate the graids.	nd scropers. material bel The scrapers ge stockpile	Ladditional dozers, will be four the liner down to will be used to haul where a light objer
zos, whereas other parts of the haul would be on haul room with very low rolling resistance. Thus, an average rolling	disc attach the materi haul roads as spotte	al. A motor s to the st ers.	tock pile and .	discing and aerating is be used to maintaling 2 laborers will be used ons of the excavation a
	209, whereas , with very low	rolling resis	is of the haus	, an allrage rolling
	resistance of 10	,		
	resistance of 10			
	resistance of 10			
	resistance of 10			

7C)	k /13/87		D. HAWK	Task No. 2 File No. 2/947 Sheet 2 of 4	4
Fc	TIMATED CYCLE				
	HAUL PROFILE	(CAT 62=	7 B SCRAPEK)	FROM BOTTOM OF EXCAUATION TO TOP	¬ F
	na direction 1 de l'app désimant programe d'allange des puissages de la constant des estre des estre des estre des estre des estre de l'appendix de l'appen	paga paga pagana a sa sa sa a s	a and and and an electric control of the control of	STOCK PILE	٠,
-			•		
			•		
				- · - £ 200'	
		= - B	C	D GR 0 9.	-
S19/	A	200	2001	GR= 290 KR= 10 %	
2197	200	GR= 290	GR=09.	RR= 109.	
	CIR=0%	PR=1090	RR=10+.		
	RR=1090				
			LOADED	UHLOADED	
	HAUL CYCLE	LENGTH	TR JIM	_	
	A	200'	10% 0.3	1 10% 0.22	
•	ઉ	200'	129. 0.3	5 89. 0.19	
	C	200'	10% 0.3		
	D	200'	129. 0.3	5 8% O19	
	Ē	200'	109. 0.3	109.0.22	
	TOTAL TIME		1.63	1.04 /	
	@ 93% ALTITUDE			/ / / / / / / / / / / / / / / / / / / /	
	DERATI	9/1	1.75	1.12 /	
- 4		<u> </u>			
	TOTAL ESTIMA	ATED CYCI	LE TIME	to the second se	
				178 /	
	HA	UL		1.75 /	
		AD		0.8 / SELF LOAD OR	
 _			DUMP	O. 8 / Push Lo	AI
		MACCACAC	1		_
				4.47 min/cycle @ 1009	7o (
				,	
			- 10 None 10		

Subject LAND FILL CONSTRUCTION - SLUDGE REMOVAL COSTS Project No. 86 C 85 4 P

Subject Lynder CC - SEUD	GE RUNNING	NC WSIG	Project No. CCCBS377
BY T. KELLEY	Checked By	y D. HAWK	Task No. 2
- TIREBEDI			File No. 21947
Date 3/13/87	Date	3/18/87	Sheet 3 of 4
			0
ESTIMATED PR	וסודטטסס	N / TEST	
D ESTIMA	TED LOA	D	
The second secon			LOAD FACTOR)
	•	18 CY X 0, 8 LF	= 14.4 cy/LOAD/
		•	, 50,0
2) CYCLE	S PER HO	UR	
and the second		(60 min/) (10	ycle/4.47 min) = 13.4 cycles
			(4.47 min) = 15.7 /hr.
3) HOURD	Y UNIT PR	RODUCTION	
* **		(13.4 cycles)	hr.) x 14.4(C.Y/cyck)
		(131)	
			= 193 cx/hr.
4) NEED	1 SCRAPER	EVERY 0.8 minu	tes
			7-10 60 = ====
		717	17min /0.8 = 5.59 / USE 6 scrapers /
5) a sea k	Azcu to	ZER BALANCE	
J Check	10511	CEK BUDYING	
	Dog	IER CYCLE 1.4(1	0.8)+0.25 = 1.37 minutes
	Siral	er cucle 14	7
	dozer	eyek 7.3	7 = 3.26/
		-	at of
and the same of th	20 056 >	4 doters to now	dle 6 scrapers.
			and the second s
6) FLEET	PRODUCT	TION EFFICIENC	1'8 1009. EFFICIENCY
	ϵ	ox 193 57/1 =	1.158 4/hr.
1	And the second s		
7) ADS	USTED PI	emin the for leve	(B)
	T. C -25E 4.2	1/58	=Y/Ar (45/60) = 870 cy/hr.
			1771, 1 7007

				_
, -	TEK	Checked By	D. HAWK	Task No
				File No. 2/947
te	3/13/87	Date	3/18/87	Sheet 4 of 4
	· · · · · · · · · · · · · · · · · · ·		1	
_	EQUIPMEN	T AND FLEET	COSTS TOP 1	. / / /
		6 CAT 62	+ B SCRAPERS (8	13225 = 200
		CAT 623	7 B screper	143 5 475
			(Standby)	$^{3}/348^{\circ} = 8088^{\circ}$ $^{1/3}48^{\circ} = 493^{\circ}$
	/ /	CAT 14G	MOTOR GRADER @	9264 = 9264
	1	- CAT D=6	DOTE BUNCHER	-9977. -6328-y
			10 EL -	1658 58
	COST +			/6.76 x2
۰			- 50	4.0
	Magazina Marania e	n .	# 1,658=0 /HR	+ 870° 1/hr. = 1/2
	and a second			
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana	esiderations taken	efficiency.
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana	esiderations taken except 45/60 %	into account for efficiency.
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana	esiderations taken except 45/60 %	efficiency.
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana	esiderations taken ecopt 45/60 %	
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana		
**	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dila perupe a sana		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		
	and a second	entro mana propostaralija, niste antenge — militaristi indicisa — r dili prope a san		

Haul Clay from Borrow to Stockpile

	EW AND PRODUCT			ce	S/Z/8	EE 7
PROJECT RMA			ant should to on	D. HAR	JK.	CREW REF NO
DENVER, C	>	•		Tom	Kaller.	
			COMPOSITION			
EXCAMPLE HAUL	WORK SCHEDULE			BORROW 7	TO STOCKPIL	Flom E
			LAI	OR COST	EQUIPM	ENT COST
CREW DESCRI	PTION	NO. REQUIRED IN CREW	HOURLY* RATE (\$/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/MR)
CAT 245 BAC	KHOE	ı	17 23	1703	14207	142 07.
CAT DOL DO	ZER	1	1688	16 38	106.37	10637
CAT DOD D		ı	1688	1688	4640	46 40
MRS 1-1005 TE		1.	1688	1688	8307	8309
10,000 GALLON V	VATER TANKER	1	1709	1709	11902	119 02
END DUMP 18		11	1709	187 22	4118	452 98
			·			
				·		
TOTALS	MANHOURS	16	LABOR COST	272 75	EQUIPMENT COST	9.49 93
_		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
EXCANATE AND HOUL CLAY TO STOCKPILE	310 CY/HR		088/24	*306/cy	BASED ON ESTIMATED N	QUANTITY TEX PLANMENT
STRIPPING				04/04		•
TOTAL EXCAPATE,					<i>Z</i> , <i>L</i>	,
HAVE AND STRIP					× 442	ley
	ik.					
	Nove:	INCLUA	DES SON	TG MOIST	LEE CON	DITTONING
*Including fringe benefits		TO Y	455UMES	5 MILE	TANK (1	ישיין

Subject EXCAVATED	CLAY COST FOR LANDFILL	Project No. <u>3603554P</u>
By D. HAWK	Checked By	Task No. 2 File No. 21947
Date 2/13/87	Date / - / - 7	Sheet of

FROM PRELIMINARY CONSTRUCTION COST ESTIMATES

GIVEN:

- ABOUT 360,000 CY ARE REQUIRED (COMPACTED) - CLAY IN-PLACE @ 100% COMPACTION

1 = 113.3 pct

Me = 14%

- ASSUMED CLAY IN-SITU

1 = 96.3 pcf

- CLAY SWELL IN TRUCK = 25% Vs compacted

THUS:

AMOUNT OF MATERIAL IN- SITH REQUIRED 360,000C1 × 113.3 3 1 = 49. 5 K

AREA ASSUMING CLAM IS 5'THICK AND 80% USEABLE 1 × 423,500 C4 × 27 0 × 1 × ACRE = 65.6 ACRE

FOR HAULAGE RY VOLUME $360,000 \times 113.3 = 453,200 \text{ CY}$ Subject Clay borrow Cost Estimate Project No. 86 C 8554 P Task No._____2 By D. Hurk Checked By T 1 File No. 21947 Date 5/2 34 Date 2/13/87 Sheet ______ of ___9 excuration IN BORROW OD8 DOZER - 1 ca @ 245 Bickhoe - Lea 1 Wheel tractor w/ disc 1 Water tanker Support Received stockers D TROUGE 1874 5 mile Assume - Destrict 1.0' to get to borrow

(2) Clay borrow o' deep

(3) 80% borrow useable Moisture conditioning included Clay dumped over fence into hot zone

Subject Clay borrow Cost Estimate Project No. 86C9554P Task No.___ 2 BY D. HAWK Checked By TCA File No. _ 21947 Sheet _____3___ of ___9 Date 3/バンパ Date 2/13/87

EQUIPMENT

TRUCK: Use 6x4/6x2 Diesel Powered Trucks Rear Dump

BACKHUE: USE CAT 245, HOE W/ 325CY BUCKET 325 HP

CYCLE TIME

BACKHOE CYCLE TIME = 23 Seconds with 3,25 CY BUCKET FROM CAT PERFORMANCE HANDBOOK.

USE 23 SECOND CYCLE TIME WITH 3 CY BUCKET > LOAD TIME FOR 18 CY STRUCK CAPACITY TRUCK 18 C4/3 C4 × 23 SEC = 138 SEC = 2.3 MINUTES. LOAD TIME 138 SEC/MIN

y D. Haux	Checked By		Task No.	10. <u>860855</u>
	·	ILK	File No.	21947
ate 2/13/87	Date		Sheet	4 of 9
TRUCK	CYCLE 10	MILE HAVE	(5 MILE	1-way)
	TURN & PO	EITION		JUTES
	2040		2.3	r) !•
	TRANSPORT LO.		10.8	"
	TURN & DO		7.0	11
	TRANSPORT E	Mery	7,1	
	TOTAL	CYCLE	21.7 m	unutes
	ADD 1.	min Mise. Time exercisy	2.0 m	inutes
	JAKI JOTOP	Time EACKWAY		
			23.7 m/	iutes
LONDED	.8 min	9.2 min.		, 3 min
LORDED	0-30mph			30 - 0 mph
LORDED	•	9.2 min. 30 mph (ne. 4.6 mi		•
LORDED	0-30mph			30 - 0 mph
	0-30mph	30 mph (ne. 4.6 min	27 mph w/ S	30-0 mph ,2 mi
	0-30mph . Z mi . 5 min, 0-45 mph	30 mph (ne. 4.6 min	27 mph w/ S	30-0 mph ,2 mi 45-0 mph
	0-30mph . Z mi	30 mph (ne. 4.6 min		30-0 mph ,2 mi
	0-30mph . Z mi . 5 min, 0-45 mph	30 mph (ne. 4.6 min	27 mph w/ S	30-0 mph ,2 mi 45-0 mph
	0-30mph . Z mi . 5 min, 0-45 mph	30 mph (ne. 4.6 min	27 mph w/ S	30-0 mph ,2 mi 45-0 mph
	0-30mph . Z mi . 5 min, 0-45 mph	30 mph (ne. 4.6 min	27 mph w/ S	30-0 mph ,2 mi 45-0 mph
UNLOADED.	0-30 mph . 2 min, . 5 min, 0-45 mph . 2 mi	30mph (ne- 4.6 min 6.1 min 45 mph 4.6 mi	(not 39 mpl -/)	30-0 mph ,2 mi 45-0 mph
UNLOADED.	0-30 mph . 2 min, . 5 min, 0-45 mph . 2 mi	30mph (ne- 4.6 min 6.1 min 45 mph 4.6 mi	(not 39 mpl -/)	30-0 mph ,2 mi 45-0 mph
UNLOADED.	0-30 mph .2 min. 0-45 mph .2 min	30mph (ne 4.6 min 45 mph 4.6 mi	(net mapl -/) time dilugs)	30-0 mph ,2 mi +5-0 mph .2 mi
UNLOADED.	0-30 mph . 2 min, . 5 min, 0-45 mph . 2 mi	30mph (ne 4.6 min 45 mph 4.6 mi	(net mapl -/) time dilugs)	30-0 mph ,2 mi +5-0 mph .2 mi

Subject Clay barrow Cost Estimate Project No. 8608554P Task No. 2 Checked By TEK D. HAUK File No. _ 2/947 Date 2/13/87 Sheet _____ 5__ of ___ 9__ Date

CALCULATE UNIT RATE / HOUR AND PRODUCTION RATE

PRODUCTION RATE BASED ON BACKHOE 2 CY/23 SEE X 60 SEC & GO MIN X 50 (efficiency) = 391 CY (LOOSE)

1 Tences @ 15910/th = \$ 15910 11 Tences @ 5827/th = 64097 #800 01/HR

UNITRATE \$ 800 02/HR = 391 CY/HZ = \$ 205/CY LOVE

CONVERT FROM LODGE TO IN-PLACE AT LANDFILL

205/cy × 113.3 pcf = # 253/cy (compacted)

IN-PLACE PRODUCTION = 391 × 90 = 3/0 CY/
1/3.3 /HZ

Subjec	a Clay borrow Cost Estimate	Project No. <u>8609554P</u>
	D, Hawk Checked By TEK	Task No
Date	2/16/87 Date	File No. <u>3/947</u> Sheet <u>6</u> of <u>9</u>
	ADDITIONAL COSTS DETRIP 1.0 FT FROM TOP SUPPORT DOZERS MOISTURE CONDITIONING	
	1) COST OF STRIPPING	
	1.0 FT x 65,6 ACRE x 43	ACRE = 27 = 105,335 C
	Feom MEANS 2.3-164-0	300
	COMMON EAFTH SCEAPE WITH 1500 FT. HA	
	UNIT RATE = #1.89	ley
	105,835 x 39/24 = \$ 200,000/310,000	= 0 = 1/c4 SA4 0 43/c4
	2) Add 2 dozers for production	- time (torgete-digs)
	24 min x cycle-truk x Cycle 18cy (loxe)	11 Teochs × 453,200 84(1000 x 60)
	= 45,920 min x HE 60 m	in 8 HR
	= 137 work days	
	CHERATING COST = 3	1367/HC = QUIF.

Subject Cley barr	on Cost Estimate	Project No. <u> </u>
By D. Hawk		Task No2
BY DITIANCE	Checked by	File No
Date 2/16/87	Date	Sheet

DGD FOR SUPPORT 140 HP 1984 ADJUSTMENT .910 Equipment -1.05 x 5920 = .910 ÷173 = 3220 = 13 20 DROKATING COST DPERATUR # 63 28/HC NO OPER. # 6323/xx 8 4x/0Ay = \$50624/DAY FOL DSL & DGD CISTS # (98600 + 50624) x 137 DAUS = # 204,000

Subject Clay borrow Cost Estimate Project No. 8609554P Task No. 2 D. Hawk Checked By TEK File No. _ =7/947 Sheet _____ 8___ of ___9 Date 2/14/87 Date 3) PROCESS CLAY FOR MOISTURE CONTENT USS I TRACTOR WITH DISC AND I WATER TRUCK USE 10,000 gal water tonter, off- highway 330HF 1984 RATE ADJUSTMENT = 1883 EQUIPMENT .883 15,575 = x1.05:173 = 83 47 = 3555 DrexaTING OPERATOR # 136 1/ AR W/ OFFIC 137 × 3 × \$ 136" = \$149,000 ASSUME WATER PROVIDED ON-SITE BY RMA UsE I wheel tractor w/ disc attachment USE MRS 1-1005 310 HP WHEEZ TRACTOR W/dise 1984 RATE ADVISTATION EQUIPMENT. 877.494050 + 173 ×1.05 =5000 OPERATING DPERATOR DISC ROWTH 400 03 x. 877 x 1.05 = 173 = 213 CPEZATING \$ 99 27 HE WOFE.

137 DAYS X 8 HES/DAY × 9992/112 = \$110,000 TOTAL = \$110,000 + 149,000 = \$259,000



Subject Clay borrow Cost Estimate Project No. 8609554P Task No. ____ By D. Hawk Checked By TEK File No. 21947 Date 2/16/87 Date

TOTAL COST TO EXCAVATE AND PROCESS CLAY #253/c4 × 360,000 \$ 128,800 200,000 259,000 \$1,591,800

> UNIT RATE = #442/cy 360,000

Clay - Stockpile to Cap Basin F

CRI	ew and product	TIVITY WO	RKSHEET		DATE PREPAR		
For use of thi	s form, see TM 5-800:	2: the presen	ent aponcy is USA		3/18,		
RMA				PREPARED BY	KELLEY	CREW REF NO	
LOCATION				CHECKED BY			
DENVER	- 100			D. HAWK 3/18/67.			
	_	CREW	COMPOSITION		,		
WORK TYPE , PLACEMENT	WORK SCHEDULE			SPECIAL INFORMA			
EXCAUATION				STRUCK INFORMA	TO CAP BA		
6			LA	IOR COST		ENT COST	
CREW DESCRI	PTION	NO. REQUIRED IN CREW	HOURLY* RATE (B/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)	
CAT 627B SCR	APER .	8	1703	13624	11737.	94216	
CAT DOL DO	ZEIZ	.3	16 88	5064	106 37	3194	
CAT 825C CO.	MPACTOR	1	1688	1688	9052	90 ⁵²	
10,000 gallon WAT	ER TANKER	1.	1709	1709	11902	11902	
CAT 14G MOTO	2 GRADER	/	1703	1703	7561	7561	
MRS 1-1005 TRA	CTUR W/DISC	/	1688	1683	8309	83°2	
LABORERS		3	1276	3828	_		
CAT 6278 SCRAPE	RS (STANDBY)	2			7537	15074	
`			•				
TOTALS	MANHOURS	18	LASOR COST	293°41	EQUIPMENT	178025	
		CREW PI	RODUCTIVITY				
WORK TASK	PRODUCTIVITY	L.	ABOR	EQUIPMENT			
EXCANATION /	UNIT/HR	MH/UNIT	SUNIT	\$/UNIT	COMM	ENTS	
PLACEMENT	1.176 ccy/hr.		025/	151/c/		•	
SAFETY	1176 cc//hr.		020/04	049/1		•	
LABOR, SAFETY				b	# 245	lec.	
- TOTALLIT					2 /	Ly V	
	•						
		. 1				-	
*Including frings benefits							

D

FORM

6418-R

(.

	CREW AND PRODUCT	TIVITY WO	RKSHEET		DATE PREPAR	EC
For use of	this form, see TM 5-800-			ACE.	3	-18-87
PROJECT				PREPARED BY	ELLEY	CREW REF NO
LOCATION DELIVE	R,CO	•	·		3/18/87	1.
	. •		COMPOSITION	·		
SAFETY	WORK SCHEDULE			SPECIAL INFORMA		STOCKPILE BASIN F
•	•		LAI	BOR COST		ENT COST
CAEW DESC	RIPTION	MECHAED MECHAED		TOTAL FOR CREW (S/HR)	HOURLY RATE (E/HR)	TOTAL FOR CREW (E/HR)
HEAVY EQUIP	MENT	15	_		3820.	57300
STANDBY EC	DUIPMENT	2	_		4 45	8 90
LABORERS		3	7805	23415		
			9			
·						
ı						
			·			
TOTALS	MANHOURS		LASOR COST	2345/	EQUIPMENT COST	5.8120
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	IENTS
SAFETY	1176 cc//hr.		020/4			•
						•
	·	·				
	•	·				
						•
*Including frings pondits						

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4	_	. :	١
•	~	•	
	•	_	

▲	WORK INVOLVED WILL CONSIST OF MAULING STOCKPILES WITHIN BASIN F TO THE BASIN CAPPING, THIS WILL BE PERFORMED AS EXCAVABLE TO MINIMIZE AREA OF BASIN F EXPOSED OFF. TWO PU DOZERS WILL BE USED FOR SCEAPERS AND ANOTHER TO ASSIST IN SPREASIN BOTTOM. A CAT 144 MOTOR GRADEX FOR LEVELING AND SPREADING. THE MATERISCED AND MOISTURE CONDITIONED DURING UT AND COMPACTED WITH A CAT 825 C COMPACTED, CLAY STOCKPILL WIRED. CLAY STOCKPILE MEET USED FOR CLAY CAPOUR F.	PLACEMENT OF CLAY CAP FOR BASIN F THE WORK INVOLVED WILL CONSIST OF A CLAY FROM STOCKPILES WITHIN BASIN F TO TH AREA FOR CAPPING, THIS WILL BE PERFORMED A PROGRESSES TO MINIMIZE AREA OF BASIN F	ofof
PLACEMENT OF CLAY CAP FOR BASIN F THE WORK INVOLVED WILL CONSIST OF HAULIN CLAY PROM STOCKPILES WITHIN BASIN F TO THE BAS AREA FOR CAPPING. THIS WILL BE PERFORMED AS EXC. PROGRESSES TO MINIMIZE AREA OF BASIN F EXPOS FOR RUN OFF. TWO DO DOZERS WILL BE USED FOR LOADING SCRAPERS AND ANOTHER TO ASSIST IN CLAY OVER BASIN BOTTOM. A CAT ING MOTOR GRAP BE USED FOR LEVELING AND SPREMOING. THE I WILL BE DISCED AND MOISTURE CONDITIONED DURING PLACEMENT AND COMPACTED WITH A CAT 825 C CON THESE LABORESS FOR SPOTTING AND GRADE CHERKING BE REQUIRED. THE CLAY STOCKPILE AREA USED FOR LANDFILL CONSTRUCTION WILL BE USED FOR CLAY CAPONED BASIN F.	WORK INVOLVED WILL CONSIST OF MANCING STOCKPILES WITHIN BASIN F TO THE BASIN CAPPING. THIS WILL BE PERFORMED AS EXCAVAS TO MINIMIZE AREA OF BASIN F EXPOSED OFF. TWO PU DOZERS WILL BE USED FOR SCEAPERS AND ANOTHER TO ASSIST IN SIZE, BASIN BOTTOM, A CAT 144 MOTOR GRADER FOR LOVE LEVELING AND SPREADING. THE MATERIAL OF AND MOISTURE CONDITIONED DURING UP AND COMPACTED WITH A CAT 825 C COMPACTED, CLAY STOCKPILE AZER USED FOR LANDEILL THON WILL BE USED FOR CLAY CAPOVER.	PLACEMENT OF CLAY CAP FOR BASIN F THE WORK INVOLVED WILL CONSIST OF A CLAY FROM STOCKPILES WITHIN BASIN F TO TH AREA FOR CAPPING, THIS WILL BE PERFORMED A PROGRESSES TO MINIMIZE AREA OF BASIN F	taucinc te basin
CLAY FROM STOCKPILES WITHIN CASIN F TO THE BA. AREA FOR CAPPING, THIS WILL BE PERFORMED AS EXC. PROGRESSES TO MINIMIZE AREA OF BASIN F EXPOS FOR RUNDEF. TWO PU DOZERS WILL BE USED FOR LOADING, SCRAPERS AND ANOTHER TO ASSIST IN CLAY OVER BASIN BOTTOM. A CAT 144 MOTOR GRAP BE USED FOR LEVELING AND SPREMOING. THE I WILL BE DISCOD AND MOISTURE CONDITIONED DURING PLACEMENT AND COMPACTED WITH A CAT 825 C CO. THESE LABORESS FOR SPOTING AND GRADE CHECKING BE REQUIRED. THE CLAY STOCKPILE AREA USED FOR LANDEICK CONSTRUCTION WILL BE USED FOR CLAY CAPOVER BASIN F.	CAPPING, THIS WILL BE PERFORMED AS EXCAMA TO MINIMIZE AREA DE BASIN F EXPOSED OFF. TWO PU DOZERS WILL BE USED FOR SCEAPERS AND ANOTHER TO ASSIST IN SA, BASIN BOTTOM, A CAT ING MOTOR GRADER FOR LEVELING AND SPREMOING. THE MAY DISCED AND MOISTURE CONDITIONED DURING HEDDERS FOR SPOTTING AND GRADE CHECKING CHECK IRED. CLAY STOCKPILE MEET USED FOR LANDEILL TION WILL BE USED FOR CLAY CAPOVER F.	CLAY FROM STOCKPILES WITHIN BASIN F TO TH AREA FOR CAPPING. THIS WILL BE PERFORMED A PROGRESSES TO MINIMIZE AREA OF BASIN F	E BASIN
LOADING SCEAPERS AND ANOTHER TO ASSIST IN CLAY OVER BASIN BOTTOM. A CAT 144 MOTOR GRAD BE USED FOR LEVELING AND SPREADING. THE I WILL BE DISCOD AND MOISTURE CONDITIONED DURING PLACEMENT AND COMPACTED WITH A CAT 825 C CONTINUED FOR SPOTTING AND GRADE CHERKING DE REQUIRED. THE CLAY STOCKFILE MEET USED FOR LANDEILL CONSTRUCTION WILL BE USED FOR CLAY CAPONED BASIN F.	SCENDERS AND ANOTHER TO ASSIST IN SIX, BASIN BOTTOM. A CAT INF MOTOR GRADER FOR LEVELING AND SPREADING. THE MATERIAL OF AND MOISTURE CONDITIONED DURING UT AND COMPACTED WITH A CAT 825 C COMPARTED. PROCESS FOR SPOTING AND GRADE CHECKING CONFRED. CLAY STOCKPILE MEET USED FOR LANDEILL TION WILL BE USED FOR CLAY CAPOVER.		EXPOSED
WILL BE DISCOD AND MOISTURE CONDITIONED DURING PLACEMENT AND COMPACTED WITH A CAT 825 C CONTINUES LABORETS FOR SPOTTING AND GRADE CHECKING DE REQUIRED. THE CLAY STOCKPILE MEET USED FOR LANDEILL CONSTRUCTION WILL BE USED FOR CLAY CAPONED BASIN F.	PISCED AND MOISTURE CONDITIONED DURING OF AND COMPACTOD WITH A CAT 825 C COMPAC PROCESS FOR SPOTING AND GRADE CHECKING CO IRED. CLAY STOCKPILE AREA USED FOR LANDFILL TION WILL BE USED FOR CLAY CAPOVER F.	CLAY OVER BASIN BOTTOM, A CAT 144 MOTOR	42 ADEK
THESE LABOLESS FOR SPOTING AND GRADE CHECKING DE REQUIRED. THE CLAY STOCKPILS AREA USED FOR LANDEILL CONSTRUCTION WILL BE USED FOR CLAY CAPONED BASIN F.	PROCESS FOR SPOTING AND GRADE CHECKING WIRED. CLAY STOCKPILE AREA USED FOR LANDEILL TION WILL BE USED FOR CLAY CAPOVER F.	WILL BE DISCED AND MOISTURE CONDITIONED DUR	NU
CONSTRUCTION WILL BE USED FOR CLAY CAPOVED BASIN F.	TION WILL BE USED FOR CLAY CAPOVER	THESE LABORSES FOR SPOTING AND GRADE CHE	
The state of the s	ganante agrapas y la la milita Militaria e e esta la parte responsa esta e e e e e e e e e e e e e e e e e e e	THE CLAY STOCKPILS MEEN USED TOR LAN	
Assume Alliof the work premamed in Cever	NE ALLIOF THE WORK PEREDRATED IN CEVEL B.	BASIN F.	
		Assume ALLIOF THE WORK PERDAMED IN L	ever B
			n valgereiter
			- •
			1 1

	• • • • • • • • • • • • • • • • • • • •	CONSTRUCTION	Project No. 860	
y D. HAWK	Checked By	K	Task No	2
	Checked by ()	. 1	File No. 21	947
ate 3/10/87	Date 3/12/3	57	Sheet 2	_of_4
	11 D			
HVELAGE	HAVE PROPILE -	BASED ON EX	CAVATION PLAN	
	* *	, 4 •	1	
			D	
AND SERVICE AND ADDRESS OF THE	- · · · · · · · · · · · · · · · · · · ·		200	52
,		6	0% GR	
A	AND IN THE RESERVE OF THE PARTY.	400	10% Re	
		4% 6,2	maaritir – viintiilla kala e diittiilliiselee I telekyttiiselee viintee allee telekyttiiselee	
5190 2001	800	5% R.P.	• •	
0% GR	oxce.			
	5% er			
	and the state of t	and the state of t	er sammanamen varige den gegeligt allerenda zur zu	
		100000000000000000000000000000000000000		
<u> ESTIB</u>	IME CHUE TIME	_ (CAT 627B 3		OADED
				o eper
See And	and Falcas	70 71	E TO	Time
SECTI	ON LENGTH	TR IIM	IE TR	TIME
	200'	10% .3	1 10%	
A	200' 800'	10% .3	1 10%	.23.
A	200' 800' 400'	10% .3 5% .65 -1% (a) .18	10% 5%	. 23. .50
A	200' 800'	10% .3 5% .65 -1% (a) .18	1 10% 5% 1% L 10%	.23. .50 .38
A	200' 800' 400' 200'	10% .3 5% .65 -1% () .18 10% _3	10% 5% 1% 	.23. .50 .38 .23
A	200' 800' 400' 200'	10% .3 5% .65 -1% (a) .18	10% 5% 1% 	.23 .50 .38
A	200' 800' 400' 200'	10% .3 5% .65 -1% () .18 10% _3	10% 5% 1% 	.23. .50 .38 .23
A B S mph assemed C D	200' 800' 400' 200'	10% .3 5% .65 -1% () .18 10% _3	10% 5% 1% 	.23. .50 .38 .23
A B S mph assoned) C D	200' 800' 400' 200' W/ 93% Altitu	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ode Centin 1.56	10% 5% 1% 	.23. .50 .38 .23
A B S mph assoned C D	200' 800' 400' 200' W/ 93% Altitu	10% .3 5% .65 -1% () .18 10% _3	10% 5% 1% 	.23. .50 .38 .23
A B S mph assence) C D	200' 800' 400' 200' W/ 93% Altitu Cycle Time	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ode Centin 1.56	10% 5% 1% 	.23. .50 .38 .23
TOTAL	200' 800' 400' 200' 200' 200' W/ 93% Altitu CYCLE TIME LOAD	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.5% = 1.56 min = 1.44 min = 1.44 min = 1.44 min	10% 5% 1% 	.23. .50 .38 .23
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ode Cerution 1.5% = 1.56 min = 1.44 min = 1.60 min	10% 5% 1% 10% min	.23. .50 .38 .23
A B B TOTAL	200' 800' 400' 200' 200' 200' W/ 93% Altitu CYCLE TIME LOAD	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ode Cerution 1.5% = 1.56 min = 1.44 min = 1.60 min	10% 5% 1% 10% min	.23. .50 .38 .23
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.56 ide Ceru	10% 5% 1% 10%	.23, .50 .38 .23 1.34 m
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.56 ide Ceru	10% 5% 1% 10% min	.23, .50 .38 .23 1.34 m
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.56 ide Ceru	10% 5% 1% 10%	.23, .50 .38 .23 1.34 m
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.56 ide Ceru	10% 5% 1% 10%	.23, .50 .38 .23 1.34 m
A B B TOTAL	200' 800' 400' 200' 200' W/ 93% Altitu CYCLE TIME LOAD JANEUVER & DUMP	10% .3 5% .65 -1% (a) .18 10% .3 1.45 ide Cerution 1.56 ide Ceru	10% 5% 1% 10%	.23, .50 .38 .23 1.34 m

D. HAWK			المورية Project No. <u>86</u>	
	Checked By	だド	Task No	
,			File No	
ite 3/10/87	Date 3	112/87	Sheeto	of_4
•				
EquiPMENT	LIST MUD C	OS 75		
		•	Y 10 - H	40 :
	AT GET B S	ceances C'	134 25 = 369	751
		Compactor C	107 = 1075	9,
		2 (10,000 GA) @	136 = 136	_
		DE GRASTE @	929 = 92=	
		ATTACHMENT C	002 - 009	_
		poes (somood) e	75 27 = 1502	I
	MEDEERS C		12 = 382	
	\$			29 /
	•		\$ 2073	1/HR
		· · · · · · · · · · · · · · · · · · ·		
		·		
Iller Post	DE CIAN D.	WOMENT THE	BASIN F CAP	
DAIT COST	of cory fa	HEETHON FOR A	SABIN F CAPI	
	2 - 29 /	- 1171 aul	1.76/00	+_/
· · · · · · · · · · · · · · · · · · ·	2013 / HR	+ 11 +6 CT/	HR = 4,76/ey	
			the state of the s	
ر سند الربيد				
No16	THIS COST	MODULET AND ET	SAFETY CONSIDE	
	SCOOP!		PERCUSPU AM TO	5/40
			FFICIONCY OF 45	5/60.
und er dingdir dans e	a section as on a conform decision .		FFICIONCY OF 4	5/60 .
	t and the second second		FFICIONCY OF 43	5/60.
			FFICIONCY OF 4	5/60 .
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Subject	DETHUDEK	COSTS - BAKIN F CON	STEUCTON Project No. 860	18554P
By D.H.	South .	Checked By TCk	Task No	2
•			File No.	
Date 3/10/	87	Date 3/12/87	Sheet3	of <u>4</u>
	DESTIMAN 2) CHOLES 3) HOURLY 4) NEED O	PUSHER COMBINATION PUSHER CYCLE T SCEARER CYCLE T SCEARER CYCLE T Each dozen	14.4 CLY × 13.6 LOAD = 14.2 CLY × 13.6 CLY	HZ. 194 OCY . HZ. evs. Use
	7) AONUST	PRODUCTION - (U) 45/60 × 1568 C COMPACTION BALANCE PRODUCTION = 14 ALTITUDE DEPARTON EFFICIENCY = 1444 × 94 × ASSUME ADDIT	16 CLY/HR = 1568 CO HE 156 CLY/HR = 1568 CO HE 156 CLY/HR = 176 CCY/HZ 1 CAT 825 C C 6 mph 1 15/60 = 1018 CY/HR 10 NOR COMPACTION FROM 14782 TANKEZ OR	2 /6"/ifts;

- Stockpiled Clay to Waste Pile Bottom Clay Liner Stockpiled Clay to Waste Pile Berms Stockpiled Clay to North Lagoon Liner Stockpiled Clay to Leachate Lagoon Liner

	EW AND PRODUCT is form, see TM 5-800-2			ACE	3-18-	
PROJECT				D. HAWK		CREW REF NO
LOCATION				CHECKED BY	_ , ,	
DENVER, CO				T. Kelley	3/18/8=	
		CREW	COMPOSITION			•
WORK TYPE EXCAVATION PLACEMENT	WORK SCHEDULE			SPECIAL INFORMA		
		1	LAI	BOR COST	7	ENT COST
CREW DESCRI	PTION	NO. REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (\$/HR)	FOR CREW (\$/MR)
CAT 627 B So	RAPERS	9	1703	153 27	117 27	1059 93
CAT DOL D	ozees	3	16 88	50 64	104.37	31911
CAT 825C C	OMPACTOR	1	16 88	16 88	90 52	9052
10,000 gallon W	ATER TANKER	1.	17 01	1709	119 02	11902
CAT 14 4 MOT	OR GRADER	1	1703	1703	75 61	7561
MRS 1-100 5 TE	LACTOR W/DISC	1	16 88	1608	838	8309
LABORERS		3	1274	38 28		•
CAT 627 B SCR	APERS (STANDEN)	2			75 37	15024
	~ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
TOTALS	MANHOURS	19	LABOR	310 <u>67</u>	EQUIPMENT COST	1898 02
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY MATE UNIT/HR	L MH/UNIT	ABOR \$/UNIT	EQUIPMENT S/UNIT	сомм	ENTS
EXCAVATION PLACEMENT	1050 C4/HE		1030/cy	#181/c4		·
SAFETY	1050 CY/HR		4022/cy	*052/cy		•
Total Equipment Labor ! Safety					- #292	/04
	•					•
Including fringe benefits						

	REW AND PRODUCT			ACE.	3-18-	
PROJECT	•	·		D. HALL		CREW REF NO
DENVER,	Co.	·		CHECKED BY	y 3/18187	
		CREW	COMPOSITION			
WORK TYPE SAFETY	WORK SCHEDULE			CLAY TO LA		
			LAI	OR COST	EQUIPM	ENT COST
CREW DESCR	IPTION .	NO. REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (\$/HR)
HEAVY EQUIP	MENT	16			3820	611 20
STANDBY EQ		2			445	890
LABOR		3	7805	23415		
			·			
TOTALS	MANHOURS		LABOR COST	23415	EQUIPMENT	62010
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
SAFETY	1050 cy/He		40 22/cy	*059/cy		•
		·				
	:					
	•					
*Including fringe benefits						

CLAY TO LANDFILL CLAY LINERS

10%62

FETIMATED CYCLE TIMES

		Los	.DED	UNLOA	Q30
SECTION	LENGTH	TR	TIME	TR	TIME
A B C D	200' 750' 600' <u>300'</u> 1850'	10% 6% 10°%	.30 .45 .52 .41	10%	.25 .50 .45 <u>.32</u> 1.52

4.60 min

@ 93% efficiency (altitude adjustment) = 5.0 min

D. HAWK	Checked By	** Cos73 Project No. <u>8608554P</u> Task No. <u>2</u> File No. <u>31947</u>
ate 3/6/87	Date	Sheet of
Need a	ne scraper every 0.6 m	rinutes
	5.0 min /cucle - 0.	6 minutes = 93 scraners
	0.0 1.0010 0 700	o. Joseph
Use o	2 D8L push CATS 4	for nine Scrapers
Use c	Check balance	6 minute = 8.3 scrapers Use 9 scripers for rine scrapers
Use c	Check balance BOOST TIME = RETURN TIME	

=> Each Push CAT can handle 50 = 4.5 scape

→ 2 D8L PUSH CATE CAN HANDLE 9 SCAPESY

Subject LANDFILL CONSTRUCTION - EARTHWORK COSTS Project No. 86C8554P Task No.____ By D. HAWK Checked By File No. _ 21947 Date 3/4/87 Sheet ____3__ of ___ S Date 11-47 PRODUCTION WITH 9 Scrapus harling @ 18 LCY/LOAD FROM GEOTECHNICAL INFORMATION C/cy @ 100% conpaction ASTM-D-678 = 113.3 pcf OB+, Mc = 14.66 SAY 113 pcf & II% Mc LOAD FACTOR FOR CLAY = 0.8 Assumed .. :. 18 LCY x .8 = 14.4 CY/LOAD 3AY 14 CY/LOAD CYCLE TIME = 5.0 minutes @ 100% efficiency PRODUCTION = 60 min - 5 min = 12 cycles
HE Cycle AR/unit Unit PRODUCTION = 14 CCY x 12 cycles = 168 CY Cycle He HE ADJUSTED PRODUCTION 168 CY x 45 min = 126 CY 45 min. hour HR 60 min HR

FLEET PRODUCTION B.3 UDITS × 12604 = 1050 CY-(compacted)

Sub	ject LANDRILL	CONSTRUCTION - EARTHS	DOER COSTS	Project No. 8	28554P	
	D. Hawk	Checked By T. F.	Task No. 2			
				File No	1947	
Date	\$/7/87	Date / / /	7		of5	
	Equip	PMENT LIST				
	Note	9 CAT 627 B 2 3 CAT D8L D 1 CAT 825 C C 1 DIESEL POWER 1 CAT 144 M 2 CAT 627 B 3 1 TRACTOC W 3 LACORET (SI FOR GENERAL	DOZERS OMPAUTOR WI DETO WATER DOTOR GRAPES SCRAPURS (SI FOREES - GRAP COSTE DET	TANKER (10, TANOBY) CHMENT OF CHECK) FERMINED A	CEVIDUSLY	
	ď	TRAFFOR W/ DISC USE MRS 1-				
		Equipment	9405° × mo mo 1730	x.877×1.0	5 = \$150 00 A	
		DFERATING	30 35 NA		= 3035/10	
		DPERATOR	1 <u>688</u> He	70	= 163/4 7721 #97 24/A	
	DISC AMELYMENT (MEANS 1986)					
		Equipment	4000 × mo	2 × 877×10	$05 = 2\frac{13}{4n}$	
		OPERATING	25		= 055 HR	
		OPERATOR	0		= 0	
				Ton	AL 263/	
		TOTAL COST	TRACTOR	w/ DISC =	# 9997/	

Subject LANGEILL CONSTRUCTION - EASTHWARE COSTS Project No. 803954 P Task No.___ Checked By By D. HAWK Date 3/1/87 Date = /1 / -

CLAY LINEZ RACEMENT COSTS / HOUR

UNIT COST WITHOUT SAFETY #2208 0 /HR - 1050 CY/HR = 1210/CY Stockpiled Clay to Waste Pile Top and Side Clay Liner

Subject	OVER PLACEMENT	Project No. <u>86C8554P</u>
By D. HAWK	Checked By TEK	Task No. 2
By D. ARWK	Checked By	File No. 21947
Date 3/20/87	Date 7/13/07	Sheet / of /

CLAY COVER PLACEMENT FOR TOP AND SCORES OF THE WASTEPILE

- 1) PLACEMENT MUST BE CAFEFULLY PERFORMED BECAUSE IT IS ABOVE SYNTHETIC LINERS
- 2) PLACEMENT WILL BE SIMILAR TO SAND DRAIN PLACEMENT; HOWEVER, A COMPACTOR WILL BE REQUIRED AND MATERIAL COSTS WILL BE SIMILAR TO THAT FOR OTHER CLAY PLACED.
- 3) FOR CLAY COVER CREW

From SHEET O OF EQUIPMENT COSTS FOR CAT 825 C COMPACTOR 16 88 a) Labor 6) EQUIPMENT

c) Sufety on Labor 3820 d) Safety on Equipment

= 41598 64/HR TOTAL COST

9052

= 251 CY/HR PRODUCTION (FROM ACTIVITY (D)

	EW AND PRODUCT				3-18	ec -a 7
PROJECT RMA	PREPARED BY T. KEL		CREW REF NO			
DEHVER	,00	•		D. HAL	JK 3/12/87	
			COMPOSITION			
EXCAVATION/PLACEMENT	WORK SCHEDULE			SAND DRA		AND PLACE
			LAT	BOR COST		ENT COST
CREW DESCRIP	TION	NO. REQUIRED IN CREW	(S/HR)	TOTAL FOR CREW (8/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (E/HR)
CAT DBL D	∞ZER	1	1688	1688 .	10637	106 37.
CAT 9660 LO	DADER		/688	1688	61 10	610
12 CUBIC YARD EN	d dump truck	4	1678	67/2	3730	14920
CAT DG DO	ZER	2.	1688	3376	4640	9280
CAT 14G MOTO	OR GRADER	/	1703	1703	7561	7561
10,000 gallon WATE	R TANKER	1	1702	1709	11902	11902
LABORERS		3	1275	38 28		
END DUMP TRUC	K (STANDBY)	1			2130	2130
			·			
TOTALS	444401133	13	LABOR	20704	FOLUPMENT	12540
101	MANHOURS		COST	207041	COST	62540
			RODUCTIVITY			
WORK TASK	PRODUCTIVITY	MH/UNIT	ASOR	EQUIPMENT S/UNIT	COMM	ENTS
EXCAUATION PLACEMENT	251 CY/HR	MH/UR.	# 082/	1249/		•
SAFETY	251 CY/HR.		1093/1	159/1		
MATERIALS DELIVERED TO STOCKPILE				1020/cy		
MATERIALS, LABOR, SAFETY					\$15 <u>98</u> /c	Y /
	•					
·						•
*Including fringe benefits						

DA FORM SAIS-R, Apr 85



	CREW AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	AE C
For use o	f this form, see TM S-800	2: the presen	ont aponcy is USA	ACE.		8-87
PROJECT	•			PREPARED BY		CHEN REF NO
LOCATION					KELLEY	
DENVER		•		CHECKED BY	11 -11	7
DENVER	700	·		1 13.	HAWK 3/19/8	7
		CREW	COMPOSITION			
WORK TYPE	WORK SCHEDUL			Terrore means	2000	
SAFETY / CF .				SPECIAL INFORMA	D DRAINS	AND PLACE
		T	LA	DOR COST		ENT COST
CREW DES		NO.	HOURLY.	TOTAL		
CHEW DES	CHIPTION	HI CREW	RATE	FOR CREW	RATE	FOR CREW
			(S/HR)	(S/HR)	(S/HR)	(S/HR)
HEAUY EQUIPM	EUT	10			38 20	20,00
HENVY EQUIPM	£/\ /	1,0			30 -	38200
STANDBY HEAV	Y FOURMENT	1.			445	4 45
J. 11840	2-011.17.2.01			•	4.	1 4 -
LABORERS		3	78°5	23415		
	<u> </u>		70	127		
	•		•			
•		1			 	
			•			
•						
		1				
		-	· · · · · · · · · · · · · · · · · · ·			
			•			

TOTALS			LABOR	1/5-		-0.45
IUIAUS	MANHOURS		COST	2345	COST	386 15
•		A B PHI A	RODUCTIVITY			
1			•			
WORK TASK	PRODUCTIVITY		ASOR	EQUIPMENT	COMM	ENTS
	UNIT/HR	MH/UNIT	S/UNIT	S/UNIT		
SAFETY	251 CY/HR	1 1	10.93/14	1.54//		•
	1231 1772		- 109	7.7.4		
	·					
			·			
	•					1
		1				·
		1.				1
* Including frings benefits						

DA PORM S418-R, Age 85

Subject LANDFILL CONSTRUCTION - EARTHWORK COSTS Project No. 86 CB 54P Task No.____ By D. HAWK Checked By File No. = 91947 Date 3/7/87 Sheet of 6 Date /

PLACEMENT OF SAND DRAIN SHOTEMS

THE WASHED SAND REQUIRED WILL BE ORTAINED From OFF -SITE, THE MATERIALS WILL BE DELIVERED BY THE SUPPLIED TO THE LEVEL BLINE AND DUMPED FIXOM A RAMP ALLOSS TO A SPECIFIED STOCKALE AREA. THE STOCKPILE AREA WILL BE FREPARED LIENG CLEAN GENERAL FILL. IT IS ASSUMED THAT 10% OF THE WASHED SAND WILL BE WASTED BELAUSE IT WILL BECOME MIXED WITH FINES IN THE STOCKFILE (PRIMARILY AT THE STOCKFILE GASE)

A DORER WILL BE REQUIRED TO WORK THE STOCKPILE SO THAT CONTINUAL DUNIDING MAY OCCUR. ONCE IN THE BASIN, THE SAND WILL EE LOADED WITH FEDOT. END LOADERS INTO TRUCKS AND CARRIED TO THE LANDFILL WHERE IT WILL BE DUMPED AND THEN SPREAD USING DOZERS AND MOTOR GRADERS. COMPACTION WILL BE PERFORMED BY SEVERAL PASSES WITH A TRACKED DOZER AND MOISTURE LODED WITH A WATER TENUIR. SEVERAL SPOTTERS WILL BE REQUIRED IN THIS DREZATION TO POSITION TRUCKS AND CHECK GEADES.

LIGHT TEXES SUCH AS TEN-TWENT CUEIC PACE TANDEMS WILL BE USED FOR HANNING SAND IN EASIN F BELAUSE THEY WILL BE KUNNING OVER LINER WITH DNCY 1-FOOT OF CONTR. POSSIBLY MAY BUILD HAUX ROADS OF GONERAL FILL OUT OVER SAND DRAINAGE BLANKET TO ALLOWS TRUCKS TO GET CLOSE TO CUMPING PORUT WITHOUT DAMAGING LINER. HAVE ROAD WOULD PROPROLY BE ITO 2 FEET OF GENERAL FILL DIER I FOOT DRAINSMID.

Subject LANDFILL CONSTRUCTION - EARTHWORK COSTS Project No. 86CASSYP Task No. ____ 2 By D. HAWK Checked By File No. _____ 21947 Date 3/1/87 Sheet _____ of ___ Date 2/- /- -

COST OF SAND DRAIN MATERIAL FROM SUPPLIER

ATTACHED ARE PRICE QUOTES FROM SURPLIERS FOR WASHED SAND DELIVERED TO RMA FILTER MATERIAL CDOH CLASS A, B OR C PROBABLY ACCOUNTE PALE 701 COOH SPECS 1981

(DST OF MATERIALS (DELIVERED)

SUPPLIER	Have	TYPE	Cost Cost
Mobile Premix (THORNTON)	5 mi	B	92/10N 84/70N 4135/10
C (Now Cony	5 mi 15 mi	GRANELIK-	750/70N 5185/70N
ALBERT FRET	5 mi	2	425/24
's Sons	5mi	_	4551
(HENCEMOON)	5 mi	Road Bec I	42- FON
BEINKMAN	5mi	FILTER SAND	# 45 FON
WOODWALD	e mi	ROAD BASE	55/20
CONSTRUCTION			- / -
(HENDERSON)			

FROM QUOTED INFORMATION ASSUME MATERIAL AT PLANT WILL COST #400/TON

DELIVERY WILL PROCABLY BE FROM WITHIN 6 MILE RADIUS OF RMA AND ASSUME 4 MILE ON-SITE MANL.

DELIVERY WILL BE AROUT 10 MILES @
AROUT "030/TON MILES

: #4 eston + 10 miles x 02/TON-MILE = 46/TON

USE 3400 lb/ey IN-PLACE/ *10/TOD * TON/2000 × 3400 /cy = \$1020/CY

Subject	LANDFILL	CONSTRUCTION- EMPTHWORK COSTS	Project No. <u>86085548</u>
. P	. Howk	Checked By TEK	Task No
y L	HAUL		File No. 21947
ate	3/7/87	Date 3/11/87	Sheet3 of6
	USED	47 946 C LOADER WITHUK. 4 C	E 4x 50/10= 33507/1040
		CYCLE TIME FOR LONDER	= 0.40 minutes /3807
		TRUCKS ARE IZ CY TANDEM	AXLE END DUMPS
		USE O.Z minutes for first low	
	<u> </u>	=> 0.2+ 2 × 0.40 minutes	= 1.0 men /1020 (3)
		+ 966 C has no denation of	
		TRUCK EYCLE TIME FOR SI	
		ELEMBERS (13 mph) V	THE SAME AS
		ADDITIONAL HAVE LOKETH.	INLL BY REQUIRED
		FOR TRUCKS AS THEY WILL	
		ON DESIGNATED HAVE RE	
		TO ANDID DAMAGE TO HE	
		-> ADD 380' TO AVE	eact Haul Fean
		STOCKPILE TO LAN	
		1700' FOR SCEPA	æzs
		ALG. HAVE FOR T	TEXES = 2000'
-		- VIII TIME FOR	
-			
		DUE TO GRADES INVOLVED A	AND SHORT HAVE
		RESTEICTIONS, RETURN TEL	P. IS WET SUGHTLY
		FASTER THAN LONDED TR	11P - 5A4 16 MPH AX
		LOADED HAVE = 2000 x /	12/13mi × mi/5280 for 100 mi/2 = 1
		EMPTY = 2000' x 145/6mi	5280 Fr = /he = /1/2
		Evolute 7	e 0.50
		Loso	
			1.75
		Manerine i Dun	
	! ! !	RETURN	
:			5.37 mis
		I a manage adaptive of different contractive and a contractive and an analysis and an analysis and an an analysis and an analy	Say 5.4 min
	· ·		
		EXCHANGE AND LOAD = 1.5 min A	and with 5.4 mm/cycle
		We need 5.4,5 = 3.6	1/60 1/-
		WE NEW - 115 - 3.4	_ Use of TRUCKS

Sub	ject LANDEILL	CONSTRUCTION- EXECUTOR COSTS	Project No. 86 C8554P
	D. HAWK	Checked By TEK	Task No
			File No
Date	2/7/87	Date 3/11/87	Sheet 4 of 6
	EST	MATE PRODUCTION	
	1	A.V. 400 = 10 04 1005	†
		LOAD FROME SAND = .9.	7
		AUL HAUL = 10 CY LOOSE / LOAD FLUTTE SAND = .9 / :. 10 CY HAULETS = 10(.9) =	9 CY IN-MACE
-			
		Unit Personanon @ 100% Efficie	•
1	AND DESCRIPTION OF THE PARTY OF	1 doed / 5.8 min × 9 C4 n 6	omin = 93 C1/ /
		15.8 min Long	HE /HZ - UNIT
		we actually have only 36 unit	to haveling in cycle.
	an again an error to the time.	We actually have only 36 units effectively	
		•	_
1		=> PRODUCTION = 3.6×93 C	45/10 x 235 = 25/04/40
1 -		-> TECHOLOGY	760 330 - 237 FAX
1	Equ	IPMENT LIST	
	-1	1 CAT OBL TO WOLK STOCK	STREAMEN
1		4 12 cy TANDOM ARLE E	
1		2 CAT DY DOZERS TO SP.	rems /
1 -		1 CAT 144 MOTOR GEARS	
-		1 10,000 GALLA WATER THE	_
	5 to 1 5	3 LORDES (SPITTES & GE	
-			
#			
			<u> </u>
	,		
-			
-			

Subject LANDFILL CONSTRUCTION- FARTHWORK COSTS Project No. _ 3633554 F Task No.____ 2 Checked By T k By D. Hawk File No. ______21947 Date 3/8/87 111. -Sheet 5 of 6 Date EQUIPMENT & LABOR COSTS 1) CAT DBL \$123 25/HR 2) CAT 966 D LOADER (200 HP) 7490 mo. * 173 Hes * . 891 x 1.05 = 4050/HR EQUIPMENT = 2060/HR = 1688 200 /m OPERATING 16 83 /ms OPERATOR. 77 98/HE TOTAL 5) TANDEM AXLE END DUMP, P4 20-8 6x4 W/BSUE AXLE (300 ME) 399500/mo x M0/73 M25x .90/ 1.35 = 2130/HR. Equipment 1600/42 DPERATOR = 160 /HR OPERATOR = 1628/HZ OPERATING 1-78/MR TOTA L 4) CAT D6 DOZERS (140 HP) 32 70/HZ EQUIPMENT \$59200 mox 1 mo/173 HES x . 910x 1.05 = OPERATING = 132/HR 1633/M OPERATOR = 1688/HE = #63 38/HE TOTAL 5) CAT 144 MOTOR GEADER 9264/He 6) *WATER TANKER (10,000 GALLON CAPACITY) 45040 = 4/364/HA 52/30/m 7) STANDAY TANDEM AXLE END DUMP 0/2 75/4 9) LABORERS (GROUPI)

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D. Har	NK	Checked By	TEK		Task No.		
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3/8/8	7	Date 3/11/	87		Sheet	6	_ of\$
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				12325/	·	_	4,33
		DOZER	. <u>e</u> .	7711/	TZ		123
		964D Lorder		5400/M		_	216
		Dumps	9	63 28 /N		2	126
		Second 20	. e .	924/4	<u>۔</u> ۔	_	92
		44 Genoc		1364/4		_	136
		e TANKER	e	2136/1	4C	<i>=</i>	
		184 END DUMP	@	den al		=	21
4	3 LAB	orgas	e	1236/	HE	=	38
					TOTAL	· E.	832
	O MATE	DELIVER SAN 3 PLACE RIGH DELIVE	25° 72	STOCK	PKE		4,020
	O MATE		25° 72	STOCK	PKE		#1029 #332
	O MATE	reign Derive	25° 72	STOCK	PKE		#1020 #332
	O MATE	reign Derive	25° 72	STOCK	PRE HR/2510		#1020 #332
	O MATE	FLACE	2EP 72 = [#] 83	STOCK	PRE HR/2510		#1020 #332
	O MATE	FLACE SPLACE STATE THIS BOST	280 72 = #83)	STOCK OF STOCK	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
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	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/029/ #332/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/020/ #333/ #/3 55/
	O MATE	FIRE POST	250 72 = 83) 15 W17	STOCK ZYY/MR X TO TO TOUT SO FX CEPT	PNE HR/251 c TAZ	CONSIE	#/02°/ #332/ #/3 55/

Waste Pile Select Fill

CRE	W AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAI	
PROJECT	form, see TM 5-800-	Z: the presen	ent aponcy is US	PREPARED BY	3-	-18-87
RMA				T. k	KELLEY	CREW REF NO
LOCATION						- ·
DENVER	DEHVER, CO.					
	•	CREW	COMPOSITION		, , ,	•
WORK TYPE /	WORK SCHEDULE		· · · · · · · · · · · · · · · · · · ·	SPECIAL INFORMA	TION CENER	4. 50.1
EXCAVATION/PLACEMENT			<u> </u>			& STOCKPILE
	0		LA	BOR COST	EQUIPM	ENT COST
CREW DESCRIP	TION	MCNEW MEDUMED	HOURLY' RATE (S/HR)	FOR CREW . (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (E/HR)
CAT 966D LC	PADERS	2	1688	33 76	612.	12220
CAT DBL DO	DZERS	3	1688	50 64	10637	31911
18: CLEIC YARD END C	DUMP TRUCK	5	17:09	85 45	41-18	20590
LABORERS	•	3.	1276	3828		
IB CUBIC YARD END O	UMP (STALDBY	1			2253	22 58
·						
TOTALS		1.7	LASOR	20013		1 1 2 79
TOTACS	MANHOURS	13	COST	20813/	COST	66921
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY	L	ABOR	EQUIPMENT		
EXCAUATION /	UNIT/HR	MHUNIT	S/UNIT	S/UNIT	COMM	ENTS
PLACEMENT	548CCY/HR		038/cy	1/22/07		•
SAFETY	548 CCY/HR		-	02//2		•
TOTAL EQUIPMENT,						
LAROR, SAFETY				·	1 81./cm	V
	•					
Including frings bondits						

	CREW AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	33/
PROJECT	of this form, see TAL 5-800	·2: the presen	ent aponcy is US	ACE.	3-1	18-87
. RM	`			PREPARED BY	•	CHEN MEF NO
LOCATION	CHECKED BY	LLEY				
DEHVE	R, CO	٠	•		- 106-	1.
				10. 1721.	DK 3/18/87	
		CREW	COMPOSITION		•	
WORK TYPE	WORK SCHEDUL			SPECIAL INFORM	ATION GENERA	al FILL =
SAFETY					BORROW T	
•	٠		LA	BOR COST	EQUIPM	ENT COST
CREW DES	CRIPTION	NO. REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (E/HR)	TOTAL FOR CREW (S/HR)
HEAUY EQUIPM	SENT (LENET D)	8		C-1000	445.	3560.
HEAVY EQUIPA	MENT. (LEVEL B)	2	-		38 20	7640
HEAVY EQUIPME	ent (Standby)) /			445	445
	٠	·	•			·
#2 CAT DAI	L Dozens IN	LEVE	B COND	ATTONS AL	OTHER	
				1		
Hex	HY EQUIPMEN	+ 12	LEVEZ	D .		
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TOTALS	MANHOURS		LABOR		EQUIPMENT COST	116 45
		CREWP	RODUCTIVITY			
	PRODUCTIVITY	L	ABOR		T	
WORK TASK	RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT S'UNIT	COMM	ENTS
SOFETY	548 Ccy/HR			# 211		
-VELT	1/HR	-		#021/en		
			•			
		1.				
		1.				
Including frings benefits				-		
A GARM RASE A						

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ubjec Y	D. HAWK	Checked By	EK CONS	Task	k No	
	3/11/87	Date 3/12			No	of
			70			
	GENERAL F	TILL - BOARD	₩ 70 e	STOCKPILE	-	
		rock involved		į		nd of
	executing	agneral till	hora i	rearly 8	tockni	le alexa
<u>.</u>	in a stock	He mile dest	inside &	and Alimpa	OB 1	some.
	Resemble	I the trans	less of n	attend &	Zames 3	the.
	de anna de la	fence line would be		estimal a	AL ARAL	10000
	bottom d	umps woi	Id has	e diffice	alty &	with
	. Seve	ial samps	will	be const	Tucke	cy to
	Constitue	line Com	that to	he end	dumo	e man
	turn and	1 dump 1	efficient	the. Tw	o does	us well
	ramp a	read to sen	spread	it to of	ther ,	outs of
	the stoc	kpile. Two	BAT 96	6 D loude	is with	L the
	in the	control area	. No me	risture Cor	rdition	ing will.
	be perform	ned at this	atime	. all wo	rk our	tride of
	Three spo	B your wi Hers will be	received!	an Lever E	ar con	ek u.
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	elsewhere	L. Com	Topsoil)	orsion.	
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			: :			
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Subject EARTH	SDER COSTS-	LANDFILL C	SUSTRUCTO	∠ Project No	. 86 C85	554P
By D. How	Checker	d By Tik		Task No	2	
				File No	21947	,
Date 3/11/87	Date	3/18/87		Sheet	2 of	4
;						
HAU	OL CYCLE	(3/4 mile	one-va) Use	1000	
		Tevus 428	Thomas	NILE 18 C	H CAPACIT	7
		grammer and the contract of th		, came of the second of the se		
	*	i i	3	C		
	500'	300		500'	LONDED	
	O- 25	25 =	Th	25-0	CYCLE	
				The Print of Administration and Administration and		
	500	30,	∞′	500'	EMPTY	
	0-35	35 ,	zph	35-0	Cycle	
		•				
	SECTION	LENGTH	Ava. S	REED	TRAVEL	TIME
			_Lu40ED	NH AND ED	المحمد	uallat R. CO
	Δ	500'	12.5 /	17.5	.45	32
	e a ser en		•			
	B	3000'	25	35 /	1.36	.97
	c	500'	13.5	17.5/	.45 1	. 32
			we		2.26 min	1.61 min
	• •	· ·				
	EXAMPLE	CALCULATE	N ;			
	} ;	1				
	500	CHR HR				nin .
		165	-600 1	ye		
LOAD	CYCLE USE				A HIINE	DIL
		TALL DUS			e De	11.0/5 00.0
		LOADE DE				
		E . 2 min f				
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		e 4 CH BU	iket e .9	Load fucto	2 2 5.60	7/4040
		18 04/3.6 04	1/400 = 3	Asses of	- LONGE	
	roillan Berlorma	.2 + 4(.4)	= 1,80m	in/wasc	TRUCK) @100	% EPE.
_ Cate	collen Kertorna	ace Handle	ook (ru. 3	()		

By D. H.	AWK Checked By TEK	Task No. 2 File No. 21947
Date 3/	0/87 Date 3/15/57	Sheet3of#
	TOTAL TRUCK CYCLE TIME EXCHANGE TIME 0.	50 minutes
	HAUL 2.	90 /
	MANEUVEZ & DUMP 0.	70
		97 minutes @ 100% 500
	Exchange & Loan = 1.40 mms	THE WITH 5.97 min cycle
•		4.3 TRUCKS USE 5
	ESTIMATE PRODUCTION	
) AVY LOAD PSZ CYCLE = LOAD FACTOR =	
	Auc. Long = 18 cy x . 8	5 = 15.3 cc4/2000
	2) Cycles Per Hove = 60 m	nin/He = cycus/5.97 min = 10.00
	3) HOURLY PRODUCTION RATE =	15.3 coy , 10.0 2000 = 153 co
	4) Hovery FLOET PRODUCTION:	= 4.3 Teurs = 153 ery = 690 me
	5) CHECK DOTER PRODUCTION	1700 × .85= 1020 cey > 65800
	6) PAONUSTED PRODUCTION E	5460 EFF.
	658 EC4 x 50 =	542 cc4

• Waste Pile Select Fill

ct East	HWORK (
D. Hou	J Z	Checked By	V TS X			No	
_					File	No	21947
3/11/8	7	Date	3/18/00		Shee	et <u>#</u>	of
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					ı		
Equip	MENT L	LIST AND	COSTS+	1	. : !		
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		16 D L					246
		18L 201			12335		1233
*	5 TANO	with apple 8	NO DUMPS	184 C	5827		291 3
	The state of the s	am axis :		e	228	<u> </u>	22.58
16)		OLITES	· ·		12 26	<u> </u>	_ 38 ²
	* ***		:	TATA	Cost	·	\$ 37.7
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+ ALL	EOU! PMB	up Lovez	D EXCE	PT AS NO	71486		
+ ALL	Equipme	ur Levez	D exce	PF AS NO			
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	TO MAU	L GOWONA	k FILL	peom .	Bozeo		

Topsoil for Waste Pile

DER DER DER DER DER DER TANKER	CREW NO. REQUIRED IN CREW	COMPOSITION	TO KEL	TION SUPPLY	AND PLA ENT COST TOTAL FOR CREI (B/MR) 106 37 6/19 14926 9280
DER DER DER DUMPTRICK ER GRADER	NO. REQUIRED IN CREW	LAI HOURLY' RATE SEMR) 1688 1688 1678 1678	CHECKED BY D. HAL SPECIAL INFORMA SAND DRA BOR COST TOTAL FOR CREW (B/HR) /688 /688 67/2 3376	TION SUPPLY ILIS EQUIPMI HOURLY RATE GE/MRI 10637 616 3750 4640	TOTAL FOR CRE (S/MR) 106 3 7 61/0 149 24
DER DER DER DUMPTRICK ER GRADER	NO. REQUIRED IN CREW	LAI HOURLY' RATE SEMR) 1688 1688 1678 1678	D. HALL SPECIAL INFORMA SAND DRA BOR COST TOTAL FOR CREW (B/HR) /688 /688 67/2 3376	EQUIPMI HOURLY RATE GAHRI 10637 612 3750	TOTAL FOR CRE (B/MR) 106 3.7 61/0 14926
DER DER DER DUMPTRICK ER GRADER	NO. REQUIRED IN CREW	LAI HOURLY' RATE SEMR) 1688 1688 1678 1678	PECIAL INFORMA SAND DRA HOR COST TOTAL FOR CREW (B/HR) /688 /688 67/2 3376	EQUIPMI HOURLY RATE GAHRI 10637 612 3750	TOTAL FOR CRE (S/MR) 106 3 7 61/0 149 24
ER DER DER DUMP TRUCK ER GRADER	NO. REQUIRED IN CREW	LAI HOURLY' RATE SEMR) 1688 1688 1678 1678	SAND DRA NOR COST TOTAL FOR CREW (B/HR) /6 88 /6 88 67 /2 33 76	EQUIPMI MOURLY RATE GE/MRI 10637 61/2 37.50 4640	TOTAL FOR CRE (B/MR) 106 3.7 61/0 14926
ZER DER DUMPTRUCK ER GRADER	REQUIRED IN CALW	HOURLY RATE SEMA) 1688 1688 1678 1688	SAND DRA NOR COST TOTAL FOR CREW (B/HR) /6 88 /6 88 67 /2 33 76	EQUIPMI MOURLY RATE GE/MRI 10637 61/2 37.50 4640	TOTAL FOR CRE (S/MR) 106 3 7 61/0 149 24
ZER DER DUMPTRUCK ER GRADER	REQUIRED IN CALW	HOURLY RATE SEMA) 1688 1688 1678 1688	707AL FOR CREW (B/HR) /688 /688 67/2 3376	HOURLY RATE GE/HRI 10637 610 3.750 4640	TOTAL FOR CRE (B/MR) 106 3 1 61/9 14 9 24 92 89
ZER DER DUMPTRUCK ER GRADER	REQUIRED IN CALW	1688 1688 1688 1678 1678	700 CREW (B/HR) 76 88 76 88 67 72 33 76	10637 6110 3780 4640	106 3 7 61/2 149 26 9280
DER DUMPTRUCK ER GRADER		/68 <u>9</u> /6 78 /688	/688 67/2 3376	61 P2 37 32 46 40	611 <u>0</u> 1492 <u>0</u> 928 <u>0</u>
DER DUMPTRUCK ER GRADER		16 ⁷⁸ 1688	67 12 33 76	37.50 46.40	14925 9280
ER GRADER		/6 ⁸⁸	3376	4640	9289
GRADER	2.				
	1	1703	1703	7561	
TANKER				10	756
	1	1702	1709	11902	11902
	3	1275	38 28		
(STANDBY)	1			2130	2/30
MANHOURS	13	LABOR COST	207041	EQUIPMENT COST	6254
	CREW P	RODUCTIVITY			
RODUCTIVITY		ABOR	BOURNEAS		······································
UNIT/HR	MH/UNIT	S/UNIT	S/UNIT	COMM	ENTS
251 CY/HR		4082/V	249/		۰
51 CY HR.		1093/01	159/01		0
			1020/1		
			164	N 72	7
ATERIALS -				75-0	104
				\$ 90.	
			-	1520/0	YV
•	•				
					•
	MANHOURS RODUCTIVITY RATE UNITIME 25 / CY/HR 51 CY/HR	MANHOURS /3 CREW PRODUCTIVITY RATE MAJUNIT 25 / CY/HR 51 CY/HR	STANDBY) MANHOURS /3 LABOR COST CREW PRODUCTIVITY RATE UNIT/HR MH/UNIT S/UNIT 15/1 CY/HR 1092/1/ 1093/1	STANDBY) MANHOURS 13 LABOR COST CREW PRODUCTIVITY RATE UNIT/HR MH/UNIT SIUNIT EQUIPMENT E/UNIT 25 CY/HR 1092/11249/1 1029/ey 1029/ey 1029/ey 1029/ey 1029/ey	3 2 38 28



	CREW AND PRODUC	THE WEST			DATE PREPAR		
Par use of	this form, see TM 8-806-	3: Me presen	FILSMEE I ontopprey is USA	ICE.	3-18	3-87	
PROJECT RMA	•			PREPARED BY	KELLEY	CREW REF NO	
DENVER	,00	•		CHECKED BY	HAWK 3/19/6		
		CREW	COMPOSITION				
WORKTYPE SAFETY / UF IN	MONK SCHEDUL	i .		SPECIAL INFORMA	AND PLACE		
JAFE I. 7	•		LA	OR COST	D DRAINS	ENT COST	
CREW DESC	CAPTION	NO. RECURRED IN CREW	HOURLY" RATE (S/HR)	FOR CREW .	HOURLY RATE SOME)	TOTAL FOR CREW (SVHR)	
HEAUY EQUIPME	EHT	10			3820	38200	
STANDBY HEAV	Y EQUIPMENT	1.		_	445	4 45	
LABORERS		3	78°5	23415	_		
	· •		•				
			۰	·		•	
				·			
					•		
TOTALE	MANHOURS		COST	234/5	COST	38625	
•		CREW P	RODUCTIVITY				
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ASOR	EQUIPMENT S/UNIT	COM	IENTS	
SAFETY	251-CY/HR		10.93/14	154/		•	
<u> </u>						•	
	4						
	•					•	
*Including frings bonding		1.		<u> </u>			

DA FORM S418-R, Apr 85

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Subject LANDFILL CONSTRUCTION - EARTHWOLK COSTS	Project No. BloCB554P
By D. Hawk Checked By T.K	Task No
•	File No. <u>-91947</u>
Date 3/7/87 Date 3/11/87	Sheet of
PLACEMENT OF SAND DRAIN SYSTEMS THE WASHED SAND REQUIRED WILL OFF-SITE, THE MATERIALS WILL BE SUPPLIED TO THE LEVEL BLIN A RAMP ALLOSS TO A SACUFIED THE STOCKPILE AREA WILL BE CLEMN LENGTH FILL, IT IS ASS	DELIVERED BY THE DECIMENT PROMED PROMED STOCKALE AREA. TO PREPARED USING UNITED THAT 10% OF
THE WASHED SAND WILL BE WITH FINES IN (PRIMARILY AT THE STOCK PLU	n the stockale
A DOZER WILL BE REQUIRED STOCKPILE SO THAT CONTINUAL OCCUR. ONCE IN THE BASIN, THE DATE DID THE BASIN, THE LANDFILL BE DUMPED AND THE LANDFILL BE DUMPED AND THEN SPECTAL PARTICLED BY SEVERAL PARTICLED DOZER AND MOISTUIN A WATER TRUCK. SEVERAL BE REQUIRED IN THIS DREAM AND CHECK GRADES.	DUMPING MAY THE SAND WILL BE DEES INTO TRUCES WHERE IT WILL DUSING DOZEES PANTON WILL BE SSES WITH A RE 200ED WITH SPOTTERS WILL
LIGHT TRUXES SUCH AS TEX- TANDEMS WILL BE USED FOR HE BASIN F BELANGE THEY WILL OVER LINER WITH DALY I-A POSSIBLY MAY BUILD HANK ROA FILL DUT OVER SAND DRAIN ALLOWS TRUCKS TO GET CO POMOT WITHOUT DAMA GING WOULD PROBHBLY BE I TO G FILL DIER I FOOT DRAIN SA	TAVING SAND IN BE RUNNING, FOOT OF CONER. HOS OF CONER. HOSE FO CUMPING LINER HAVE ROAD FOET OF GONERAL MID.

Subject LANDFILL CO	NSTRUCTION - EACTHUD	ex Costs	Project No. 8	6CB554P
	Checked By TEK		Task No	2
By D. HAWK	Checked by Cit		File No	1947
Date 3/7/87	Date 3/11/87			_of
				and the second s
1	:		. C	
COST OF	F SAND DRAIN MA	TERNAL PEON	i SUPPLIERC	
1 4	TACHED ALE PRICE	QUOTES FR	M SUPPLIERS	- poe
4	VASHED SAND DEZ	IVERED TO	RMA	
F	TLIBE MATERIAL CI	DOH CLASS	A, B on C, TROBAS	scy Adequate
	PALE TOI COOH S	PEZS 1981		
	DOT OF MATERIALS	/ DOLLARED	1	
	DOI . Dr. 1:111/EZIAFW	LECTION C		
	SUPPLIEN	Horrie	TYPE (20ST COST
				MERIN HAVE
	Mobile Premix	America e	B 4	1/102 1/85/n
g and the additional party and attenues to the same of	(THOENTON)	5 mi		75/1000 185/1
•		15mi	ROAD DASE 3/4"	375 /TON SEA
	# # # # # # # # # # # # # # # # # # #	•		
	ALBERT FLOT	5 mi	B	425/00
	Sons	5 m!	Balant	425/124
and the second s	(HENDERSON)	5 mi	Romo Bed I	43 ABN
AND AND A COMPANY OF THE PARTY	Benkman	5ni	FICTE SAND	# 445 from
	WOODWALD	5 mi	ROAD DASE	535/10N
page or make the retire to American with Safety Str. Marghan Control of the Contr	Constitution	and the second s		
	(HENDERSON)	<u></u> .	**	-
				-
The second section of the second section of the second section	The second secon	Linkson in A	AND THE RESIDENCE OF THE PARTY	
F	com QUOTED INFORM	ATTON ASEC	ME MATERIA	L AT
	WILL COS	T _ # 4 00 /	TON	_ <u>-</u>
				1
	BLIVERY WILL PLOCA	ALY DE FR	שאדוש אב	6 MILE
R	SOUS OF RMA	ND ASSUME	4 mile o	N-SITE
	AUL.			1
				-
	DELIVERY WILL	BE ABOUT	10 MUSS R	
	A800- 010/1	, —		
	44 00 HON + 1	Omices × 02	TON-MILE = 4	170~
1				
	USE 3400	ID/EY IN-PLA	KE /	02011
1	White T	2011 - 3	100 /cy = 41	TY
	Y/an x	BOME .	101	

_		CONSTRUCTION - EARTHWORK COSTS Project No. B6C8559/
Ву .	D. Howe	Checked By TEK Task No. 21947
Date	\$/7/87	Date 3/11/87 Sheet 3 of 6
	:	
-	0 0	T 946 C LOMOR WITHUK 4 CY BUCKOT WILL BE
	USED	TO LODO TRUCES @ SHOT EFF 4x 50/60= 37504/LONG
		CYCLE TIME FOR LONDER = 0.40 minutes /38
		TRUKS ART IZ CY THURST AND OWNES
	The second secon	USE O.Z my rutes for first load & . 4 murutes thereast
		=> 0.2+ 2 × 0.40 minutes = 1.0 min /1020 (
		TRUCK EYCLE TIME FOR SHORT HAVE ~ 2000 L
-		ONE way will BE ABOUT THE SAME AS
		sceness (13 mph) v
		ADDITIONAL HAVE LOXIN WILL BU REQUIRED
٠	and the second s	FOR TRUCKS AS THEY WILL HAVE TO STAY
	- b department - 1 th -	ON DESIGNATED HAVE ROADS IN LANDFILL
,		TO AVOID DAMPAGE TO HOPE LINEZ.
		- ADD 380' TO ANEERE HAVE FEIN
		STOCKPILE TO LANDFILL WHICH WAS
		1700 FOC SCEARES
		=> A14. HANK FOR TEXES = 2000'
		DUE TO GRADES INVOLVED AND SHORT HALL
-		RESTRICTIONS , RETURN TELP IS WET SUCHTLY
		FASTER THAN LONDED TRIP - SAY 16 MP 4 1
		100000 Have = 2000 = 1 MZ/13mi x mi/5281 ft 160 mg
		Empry = 2000 # 1 1/16 mi x 1/5280 ft = 10 mi/hr = 1
-		
		Excumite Time 0.50
-		100
		HALL COMPED V 1.75
-		Mancrope Dung -70-
		Rotues 1.42
-		5.37 min
4		
 		54 5.4 min
		Exchange me LOAD = 1.5 min and with 5.4 min byce
		We need 5.4,5= 3.4 Use 4 TRUCKS-

Subject LANDEIL CO	NSTRUCTION - EXETNINGER COST	Project No. <u>86 C8554P</u>
		Tesk No.
By D. Haure	Checked By TEK	File No
2/2/27	Date 3/11/87	Sheet 4 of 6
Date 3/7/87	0,0,0,	
ESTIMA	E PRODUCTION	
	HAUL = 10 CY LOOSE / AD FROME SAND = 9 / 10 CY HAULETO = 10(.9) =	
Hw	L HAUL = 10 CY LOSS	
	10 CH HAULED = 10(.9) =	9 Cy IN-MACE
UN	IT PRODUCTION @ 100% Effici	ency
	1 doed/ x 9 C4 x 1	HE HZ - UNIT
		1
<i>W</i>	e actually have only 360 un	its howling in cycle
	stectively	
	PRODUCTION = 3.6×93	ex/He = 335 01/HR
	PRODUTION & INSTRUBRCY	45/60 = 335 = 25/ CY/H
EQUIPA	MAY LIST	
and the second s	1 CAT OBL TO WOLK STOR	write.
7	1 CAT 944 D TO LONG &	STOCKPILE
	4_12 by TANDOM AXLE	DO DUMES
	2 CAT DY DOZERS TO S	PROTECTION
	1 10,000 GALIN WATER TH	UKER DE MOBRINE
	1 STANDBY TANDEM AXL	E END DUMP
	3 LOGORS (SPORTES 5 4	CADE CHECKERS)

Woodward-Clyde Consultants (

Subject LANDFILL	CONSTRUCTION - FARTHWORK C	OSTS Project No. <u>86C8554</u>
- W	Checked By TEK	Task No.
Y D. HAWK	Checked By	File No
ate 3/8/87	Date 3/11/27	Sheet <u>5</u> of <u>6</u>
EQUIF	PMENT & LABOR COSTS	
	T DBL	= \$123 E/HR
1		_
2) CA	T 966 D. LOADER (200 HP)	73 M2 = 89/x 1.05 = 405/HR
	DOMESTAL = 2040/HR	= 20 ¹ /m
mananan an	DASKATOR - 16 80	= 1689/me
		68 /
		Toral = 77 28/HR
3 -		
3) Tar	IDEM AXLE END DUMP P4	20-8 6×4 w/ BOUT ALLE (300+ 18/73 M28 × 901×1.05 = 21 30/H2
	Equipment : 38450/m x "	= 16 =/AR
	OPERATING = 160 /HR OPERATOR = 16 28/HR	= 1678/HR
mb = + 497	United 10th 14 THE	
, , sales y explanate rece .	. The second of the second	TOTAL = 54 03/10
4) CA	T D6 DOZISES (140 HP)	Appendix of appendix of appendix of appendix of a part of the second of
	EQUIPMENT \$920 /mox1	173 NES N. 910x 1.05 = 32 =/HE
	OPERATING = 132/AR	= 13=/100
	OPERATOR = 1608/HR	= 1693/H
, and an electricity of the special property of the sp	garinda er - da kerimpinansansa ugaman nahadaman san, kida kamanan uru dambi. Tirab ink uru an ink	\$, 28)
A. A. MATTER T. 1.		TOTAL = \$43 38/A
		= "qzey/
	T 144 MOTER GRADER	42-7
1) *1.3	TER TAXER (10,000 GALON	CAPACITY) 450HP = 1364
(0)	THE THIRE IC (10, DE GHODE	
7) -50	THOOLY TANDEM PALE END DU	mp = *2/2º
g) L	BOZERS (GROUP 1)	- 12 25,
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4 10-	T LEDITEATED IN GENER	AL FILL BST CALCULATIONS

Woodward-Clyde Consultants

Subi	ect Lan	DEILL	Cons	TEN CTT	N-E	PETHO	per	CASTS	Project N	lo. <u>86</u>	C8554 F	>_
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Woodward-Clyde Consultants

- 60 mil HDPE Liner 12 oz. Geotextile Filter Fabric 200 mil HDPE Geonet (Drainage Net)

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	REW AND PRODUCT			ACF	DATE PREPAR	3/87				
PROJECT RANA		,		PREPARED BY T. KE		GREW REF NO				
DETNER	,00	•		D. HAW	x 3/18/87					
WORK TYPE	WORK SCHEDULE		COMPOSITION							
EXCAUATION/PLACEME,			· · · · · · · · · · · · · · · · · · ·		TO STOCKPILE					
	•	NO.	440440444	BOR COST		ENT COST				
CREW DESC	RIPTION	REQUIRED IN CREW	HOURLY® RATE (\$/HR)	FOR CREW (S/HR)	HOURLY RATE (S/HR)	FOR CREW (S/HR)				
CAT 627 B	SCRAPER	8	1703	136 24	117 77	94216.				
CAT D6 DO	ZER	1	1688	1688	4640	46 40				
LABORER		1	1276	1276						
CAT 627 B SCR	APER (STANDBY)	2.	·		7537	150 24				
			٠			·				
•										
	•		·							
	·									
TOTALS	MANHOURS	10	LABOR	/65 88	EQUIPMENT COST	1139 00				
	•	CREW P	RODUCTIVITY							
WORK TASK	PRODUCTIVITY	MH/UNIT	ABOR	EQUIPMENT	COM	ENTS				
EXENUATION/ PLACEMENT	847 85 /HR	-A-1-3-4-11	020 /	1 34 /		*				
SAFETY	847 KY			000/		•				
	FILE					· · · · · · · · · · · · · · · · · · ·				
TOTAL EQUIPMENT LABOR AND SAFETY					= 16 <u>0</u> /8	BCY V				
	·									
						•				
Including fringe benefits .										



	CREW AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	EC
For use of	f this form, see TM 5-800-	2. the prepend	nt apency is US		3/18	187
PROJECT				PREPARED BY	•	CREW REF NO
LOCATION				(. KE	LLEY	1 .
DENVER		•		CHECKED BY	ox 3/18/87	
- LNOEE	100				JE 3/18/8/	
		CREW	COMPOSITION			
WORK TYPE	WORK SCHEDUL			SPECIAL INFORM	ATION TOPSO	11
SAFETY					D STOCKPILE	
•	•	NO.	HOURLY*	SOR COST		ENT COST
CAEW DES	GREW DESCRIPTION °			FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
					•	۰
STAND BY EQUI	PMENT	11	-	T -	445	48 ⁹⁵
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TOTALE	MANHOURS		LABOR		EQUIPMENT	4895,
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	PRODUCTIVITY		NOR	EQUIPMENT	1	
WORK TARK	UNIT/HR	MH/UNIT	WUNIT	EUNIT	COMM	
SAFETY	847 BCT/HR			006/	EXCEPT TI	SUCKS
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	TOPSOIL	COST	5	BORRO	w To	Srock	PILE				
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	STRIPPIN	76 0 F	5 70/	PSOIL A	ND PLA	CEMEN	IT IN	A 57	OCKP/	LE	
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	WILL	BE F	POUN	o w	THIN .	1 mil	E OF	BAS	5/1	F.	
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	ELAY	BORKE	20	SOURCE	5 15 ·		LES A	way.	- R	44	~~
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	Some PAY N	INCRE	nay	85 E		TO HE	TWEY!	m.	Loso.	Reso	16).
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	Some PAY L WILL STOCK	INCRE DAD I BE A DHE CPILE	MAY CAT AND	25 B	SXPECTE FOR IN NO FIEL IN NO FIEL IN	WILL POX	BE U	TR. C	LOAD .	RED. O.7 SHAI	(0). ~
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	Some PAY L WILL STOCK	INCRE DAD I BE A DHE CPILE	MAY CAT AND	25 B	SXPECTE FOR IN NO FIEL IN NO FIEL IN	WILL POX	BE U	TR. C	LOAD .	RED. O.7 SHAI	(e) ~

Subject LANDFILL CONSTRU	UCTION - EASTMUNE COS	75 Project No. 86 C8554 P
By D. HAWK	Checked By	Task No. 2
	4	File No
Date 3/10/87	Date 3/12/87	Sheet of3
CYCLE TIME	CAT 627 B SCRAPE	<u>×5</u>
ASSUME A	WERALE HAUL LENGTH	< 1 mile use 3/4 miles
	•	
HAVE L	= (6828) + ² = HTDLE	= 3960' USE 4000'V
AT 5%	TR AND 4000' HAVE	AND 93% ALTITUDE DERATION
	HAUL TIME	= 2.63 MIN (2.45 = .93)
	RETURN TIME	.88 MIN (1.7593)
	LOAD TIME MANGUVER RUMP	= .60 MM C.K.
	TOTAL CYCLE TIME	591 MIN @ 100% EFE.
	with the statement of t	
ESTIMATE PROM	OUCTION	
) Estimi	ATED LOAD = 18 C4	* .70 (L.F.) = 12.6 CY/LOAD-
2) CVOLES	PER HOUR = 60 min	1 CYCLE = 10./ CYCLES /
	He	* 1 CYCLES = 10.1 CYCLES & 5.91 min HR.
2) 11,	Man Prince Took T	2.6 BCY x 10.1 CYCLES = 127 BCY
S Noorcy	UNIT PROBUCT TOOL = 12	HZ HZ
	ONE SCRAPER EYELY > 5.91 + 0.8 = 7.4	
	25.11 7.0.1 - 1.7	344 8 3604623
5) Hours	4 FLEET PRODUCTION	
	B SCRAPERS × 127 BC	4 = 1016 04
		e-scentore HR
W ADJUST	80 PRODUCTION (50 P	MINUTE HOUR NON-HAZARONS)
	50/60 × 1016 304 =	847 DOY
	HR	He
i		

				- EARTHWOA	er Costs		. <u>86C</u>	<u>8554 .</u>
iy D	. How	K	Checked B	y TEK		Task No	2194	187
	1 /0	a	_	1: 1:37				
ate 🕹	3/10/8	/	Date 3/	112/87		Sheet	<u>\$</u> _0	
	Equi	PMENT	- LIST	i Cost	<u>5</u> _	:		
		8	CAT 627	B SCRAPE DOZE SCREPES ((SPOTTER)	res e	13480	= /	0784
	, Z,) 7	CAT DO	Scenaras /	(STANDER) @	7537	=	63 24
	. I	57	LABORER	(SPOTTER)	C.	1276	==	12 26
	44		-,					,,
	de plant de l		** *				4/2	305 4
								·
	POST	70	STOLD ON	O STOCKPILL	5 Tops	OIL NATA	R. BASIA	JE
		4/3	05 18/HR	x 1 HR/	847 BC4	= 41	SY BC	H.
= .			•					
-				***			•	
		••			<u>.i</u>	*** * *		
					* ***			
			i ; ;	Ì		giording, on minus success region data. L. mos.		
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	**************************************		•		t y	and the second s		
	·		<u> </u>	W Mar - A Minorgan				
-			<u></u>	a a sa andere W r se	·	• • ;		
			and the same of the same of the same of	مهمستند سند د این د انهادید			*	

	W AND PRODUCT				DATE PREPAR	
For use of this PROJECT	ferm, see TM 8-800-2	2: the present	int approcy is USA	CE.	3/18	
RMA				T. KI	FLLEY	CREW REF NO
DEHUER ,	-	• •		CHECKED BY	WK 3/18/87	
DEHVEN!		 		D. HA	WE 3/1981	
			COMPOSITION	·		
EXCAVATION PLACEMENT	WORK SCHEDULE			SPECIAL INFORMA	TON TOPSO	
			LAB	OR COST		ENT COST
CREW DESCRIP	TION	NO. REQUIRED IN CREW	HOURLY* RATE (S/HR)	FOR CREW (E/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
CAT 627B SCI	RAPER	6	1703	102 18	117===	70662
CAT DOL DO	ZERS	2	1688	3376	106 37	21274
CAT 14G MOTO	R GRADER	1	1703	1703	7561	75 ⁶¹
CAT D6 DOZ	ER.	١.	1688	1688	4640	4640
LABORERS		2	1276	25 52	_	·
CAT 627B SCR	APER (STANDBY)	/			7537	75 37
			• .			

TOTALS	MANHOURS	12	LASOR	100 37	POUIPMENT	11174
10126	PUDHNAM	12	COST	195 37 /	EQUIPMENT COST	1,1.16
	, <u> </u>	CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY	MH/UNIT	S/UNIT	EQUIPMENT \$/UNIT	COMM	ENTS
EXCAUATION/PLACEMENT	1,020 ccy/hr.		HO19//	4/09/04		•
SAFETY				4005/		•
				/ /		
TOTAL EQUIPMENT, LABOR , AND SAFETY					#133/c	CY
	-	·				
Including frings benefits		<u> </u>				

DA FORM MISR, AN ES

	CREW AND PRODUC	TIVITY WOR	RKSHEET		DATE PREPAR	
PROJECT	f this form, see TM 5-800-	2: the present	nt approcy is US		1 3/	18/87
RMA	•			PREPARED BY	VELLEY!	CREW MEF NO
OCATION				CHECKED BY	KELLEY	
DENVE	R .CO	•		Differente	KELL EY 3/18/87	
					3/10/8/	1
		CHEM	COMPOSITION			
ORK TYPE	WORK SCHEDUL			SPECIAL INFORM	ATION TOPSO	L-STOCKPIL
SAFETY						SINF .
•	CREW DESCRIPTION		E.	LEOR COST		ENT COST
CREW DEA			HOURLY' RATE (S/HR)	FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (E/HR)
STANDBY EO	TAHOBY EQUIPMENT				4.45.	4895.
***************************************	•		•			
			٠			
					-	
			•			
				<u> </u>		
TOTALE	MANHOURE		LABOR	-	EQUIPMENT	4895
		11	COST		COST	40-1
		CREW PR	ODUCTIVITY			
WORK TASK	PRODUCTIVITY	LA	SOR	EQUIPMENT		
WORK I ASK	RATE UNIT/HR	MHVUNIT	\$/UNIT	SOUNIT	COMM	ENTS
SAFETY	1,020 cey/			005/	ALL EQUIPMENCED TRE	ucks on
					STANDBY S.	AFETY FOR
					LEVEL T	_
	•	·				
						•
including fringe benefits						

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	0	_

Date 3/10/87	Checked By TEK Date 3/12/87 Casts - Stockale to	Task No
PICKIA AND I CAPS. 2 CA	THE WOLK INVOLVED IN THE USE UP TOPSOIL FROM A PLACING IT ABOVE THE BO CAT 627 B SCRAPERS W T DBL DOZIERS AT THE ST	TS COST WILL INVOLVE STOCKPILE NEAR BASIN F ASIN AND LANDFILL CLAY WILL 85 USED ASSISTED BY
MOT FOR	DOZER AND SPREAD AND L DR GRADER. TWO LABOR SPOTTING AND GRADE CA TT IS ASSUMED THAT A	EVERED WITH ONE CAT 144 ESES WILL BE REQUIRED HELLING. TLL TOPSOIL PLACEMENT WILL LAP PLACEMENT WHOER LEVEL

Subject <u>EARTHWORK</u> By D. Hawk Date 3/10/87	Checked By 72 K Date 3/12/87	Task No File No	2 2 21947 2 of 4
ESTIMATED C	LYCLE TIMES (627 B SCENDOR)	8	200' 5210 GR = 0% CR = 10%
Re = 59 Haul Cyc Section A B C	ee	LOADED TR TIME 5% .50 0% .40 10% _31	UNLOADED TR TIME 5% .48/ 10% .23/
TOTAL ES	e 93% Altitude D	£	
R	ANEVUSE & DOMP	= 1.30 min 1.20 = .60 = .60 = .60	@ 100% EFF.

Sub	ject EARTH	WORK C	OSTS - BASI	IN F CONS	TEUCTON	Project No.	_ 36 CE	3554P
D	5 Hay	r	Charled Bu	TER		Task No	3	<i>એ</i>
	D. Haw		Checked by			File No	0194	7
Date	3/10/87		Date	3/12/87	0		3_ of_	
			COTTON					
1.								
-	D	ESTIMA	TED LOAD	18 64	1 x 170,0	LOND PACTO	e) = 12.6 	CCY/WAO
	2)	Cycles	PER HOUR	60 min	X CVCL	£ =	16.2 cra	ues /
				₩Q.	3.70	mn	HZ	
	3)	House	Unit People	ו עסרדטנ	2.6 <u>04</u> .	× 16.2 exe	<u>urs</u> = 20	of ten.
								HE
	4)	NEED	SCHAPOR 3.7	5/824 0 0 ÷ 0.6	= 6.2	es Sceapte	5 → Vse	61
		a san asan a san mara a		• • • •				
	5)	CHECK	Push Doz	se BALANC	€ .			
			Dosere	CHUE =	1.46.63	= 35.	1.09 min.	ines of
	and the second s	- *	SCEAPER	CYCLE =	3.70 =	3.4:	SCENPERS/	were
					4			
			> Ear	ch dozer c	an hand	1k 3+	Scraper	S
		3	: • • • • • • • • • • • • • • • • • • •	702	1 4 204	6 004	- /ファ	ر درم
		C 100	% EFFICIE	non .	× 209	HR	= 1224	Me.
	; we have a manufacture difference of the control o	a amagazatta ata	the state of the s	Andrews Assessment Asses				
			D PRODUCT		0/60 × 1	224 04/4	= 102	OCCY ,
			D PENTERT	1				
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			TO THE PERSON OF	1	1	_ :		
			} { } }		· · · · · · · · · · · · · · · · · · ·			

EARTHWORK (
D. House	Checked By 7	5 K	Task No. 2	
			File No	3194
2/10/87	Date 3//	2/97	Sheet	4_ of_
<i>₹</i>		-/07		
			•	
EQUIDMENT	FIRET & COST	3	. ;	
6 car	627 B SCRAPET	ES PHIZUE		808
2 Car	DSL DAZARS	@:123	=	246 55
CAT	144 MOTOR GRA	HOGO @ 92		92 28
CAT	DO DOBES.	- 63-	. =	42 <u>28</u> 75 <u>37</u>
2 lacros	627 B SORAPGE CO	C 12 75	•	255
	process with a fight substitution of million with the lighter release of the		namen and the second	
		TOTAL COS	- =	4/3/2 4/
	•			
-				
Cost to	PLACE TOPSOIL	- STOCKFILE	70 BA	SIN F
**	1- 1- 1-	1 40 1		1 6 1
	1312 /He	e 1 He/1020	CC4 =	1/6/00
	1312 /He	1 He/1020	CCY =	4/E/cc
	1312 /He.	e 1 He/1020	CC4 =	4) e /c
	1312 He	2 1 He/1020	CC4 =	4) e /c
	1312 He	2 1 He/1020	CC4 =	4) e /c
	1312 /He	2 1 He/1020	CCY =	4) e /e.
	1312 /He.	2 1 He/1020	CCY =	4) e /e.
	1312 He	2 1 He/1020	CCY =	4) e /ec
	1312 /He.	2 1 He/1020	CCY =	4) e /e.
	13 12 "/HE	2 1 He/1020	& Y =	
	13 12 "/HE	2 1 He/1020	&Y =	
	13 12 ²¹ /He.	2 1 He/1020	&Y =	
	13 12 ¹¹ /He	2 1 He/1020	& Y =	
	13 12 ¹¹ /He	2 1 He/1020	&Y =	
	13 12 ¹² /He	2 1 He/1020	&Y =	
	13 12 ¹² /He	2 1 He/1020	& Y =	
	13 12 ¹² /He	2 1 He/1020	&Y =	
	13 12 ¹² /He	2 1 He/1020	& Y =	
	13 12 ¹² /He	2 1 He/1020	& Y =	
	13 12 ¹² /He	2 1 He/1020	&Y =	

Waste Pile Sumps and Piping

Project: Name: Basin F	
Location: RMA	
Quote #1 18-1 (Estimate Sht. No)	
Firm: Hame: See below	
Locations	
Telephone No.: ()	
Person Talked To:	•
Type of Quote: Supplier, material only (FOB Point:	_>
Subcontractor, material installed (Cost to Prime)	

Scope/Description/Amount of Quote:

Our cost estimate was based upon an independent calculation of the manhours required to install these materials added to the manufacturing cost, and upon telephone estimates from the three leading companies in manufacture/installation of MDDR gesmembrance. All costs were based upon installation of synthetic materials under summer conditions and in level B personal protective gear. The cost satimates de set include: construction field and office angineering; independent quality assurance engineering; preparation of subgrade cut-and-fill, compaction, removal of rocks larger than 1/2-inoh); site dewatering; pump station for leachate/leak removal. We also assume that our conceptual design (with a minimum number of penetrations of liner) will be implemented. The estimates are displayed in the accompanying table.

1. 60-mil HDPE Geomembrane #0.74 · HDR Level B PPG #0.75 Gundle ec.ec National for " USC 6 90.88 Bohlegel " USC 6 \$0.24 Buhlegel " USC 6 \$0.22 National Seal " USC 6 \$0.22 National Seal " USC 6 \$0.25 Gundle " USC 6	ITE	iti	ESTIMATED COST (\$/LAYER/SF)	BSTIMATED BY	INSTALLATION COMMENTS		
2. 16 os. PP Geotextile \$0.24 Sublegol # Use of	1.	60-mil HDPE Geomembrane	\$0.75 e0.60	Gundle National Sonl	Level B PPG	use	6 80/s
\$0.26 Quadle " use o	2.	•		Suhlegol		use	025/
Date Quote Received.	3.	Date Quote Received:				υse	032

FM. INSTALLATION COST ESTIMATE

ASSUME:

Supplied Air Protective Clothing 20,000 eq. ft./day

LABOR CLASSIFICATION	DAYS	SALARY	RENTAL	PER DIEM	MOBILIZATION PERSONNEL EQUIP	SATION	SAFETY	DIRECT + FEE	SALARY + PROFIT	TOTAL
Supervisor (1)	48	\$5.497	05	\$2.287	\$1,200	0\$	\$3.430	\$7.609	\$6.322	\$13.931
Head Welder (1)		\$4,398	0\$	\$2,287	\$1,200	0\$	\$3,430	\$7,609	\$5,058	\$12,667
Welders (2)	91	\$7,916	\$0	\$4,574	\$2,400	0\$	\$6,861	\$15,218	\$9,104	\$24,322
Technicians (3)	137	\$9,895	0\$	\$6,861	\$3,600	05	\$10,291	\$22,827	\$11,380	\$34,207
Qual. Contr. (1)	46	\$5,277	0\$	\$2,287	\$1,200	80	\$3,438	\$7,609	\$6,069	\$13,676
Laborers (12)	549	\$35,876	0\$	3	\$0	0\$	\$41,164	\$45,281	\$41,027	\$86,308
Operators (1)	46	0\$	0\$	3	0\$	9	\$3,430	\$3,773	0\$	\$3,773
F. M. Loader (1)	46	3	\$22,869	3	0\$	\$1.000	20	\$26,256	0\$	\$26,256

\$ 0.235 per sq. ft. labor \$ 0.220 per sq. ft. material \$ 0.180 per sq. ft. profit and overhead

\$215,142

\$78,960

\$136,182

\$72,044

\$1,000

009'6\$

\$18,296

\$22,869

\$68,659

1001

SUBTOTAL = \$ 0.635 per eq. ft. \$ 0.739 incl. contingency

USE 4088/SF WHEN MOLUDES SUB OF P BUT NOT CONTRACTOR OF D

8 090 /sr w/ 05P

Liquid Removal System

CONSTRUCTION COST	ESTIMA	TE		BATE PREPARED	7.	7. SHEET / OF				
PROJECT	۰					OR ESTIM	ATE			
LOCATION				•			(No doord		e (ed)	
DENVEZ, CO							(Final de			
WCC/HDR		ESTIM	ATOR		La	CHECKS		073	Design	
). HA	wx.			Ton	n Kel	<i>12</i>	
LANDEILL SUMPS SUMMARY	QUANT MG.	UNIT	PER	LABOR	PER	MATERIA		1	TOTAL	
	UNITS	MEAR		TOTAL	UNIT	70	7AL		COST	
PIPING			1111							
6" PVC	2/00	FT	1 44	B 18, 144°	5=	11,6	250	2	9,820 °C	
16" PVC	105	FT	33	B 224 12	332	350	59-1	5	808	
CRAVEL	6	cy	578	B* 3468	1020	61	20 /		9583 V	
EXCANATION	6	CY	4.5.			-		- 5	6000 V	
									7. ************************************	
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						TOTA	n 1	36.	124 48	
						•				
						SA	4	36	12000	
									····	
·										
·										
B INDICATES LEVEL	B 45	TAR	D-	Use 6× L	BOC	ATG				
B* INDICATES LEVE	B	MA	- 0	SARRY IN	CLUDE	<u> </u>				
		-								
		1								

- Sewer and Miscellaneous Debris Removal Haul Waste to Solidification

CONSTRUCTION COST	ESTIMA	TE		DATI	E PREPARED		SHEET	OF			
PROJECT				·	_/8/	BASIS F	OR ESTIMATE				
BASIN F				es d'Estado		c] cook & (Ne deer	pr completed)			
RMA Denver	•						DOE & (Prolummery	_			
ARCHITECT ENGINEER	•] coot c (Final do THER (Spealty) <u>6</u> (
HDR DRAWING NO.		ESTIM	ATOR				CHECKED BY				
•		1	-	Kot	twitz			PICKSOU_			
Sitework Summary	QUANT	I.		LAB			MATERIAL	Equiement			
Civil SUMMARY	NO. UNITS	UNIT	UNIT	0	TOTAL	PER	TOTAL	COST			
Water.	•						•				
Top Exist 2" Line	2	EA	10.00	В	120	31.00	60				
Pipe PVC Class 160 2°	3/5	LF	1.76	B	3,226	0.32	101				
Backflu Preventer that Z"	2	EA	26.00	В	312	120	840				
Manhole 4'ID x 6' Dep	2	EA	52.00	B	624	320	640	20 - 4			
Manhole Top 8" The	2	EA	52.00	В	624	32	164	20 - 4			
Manhole Guere 24" \$ 30016	2	EA	48.00	B	576	115	230	18.60 - 3			
Screened Stone Bedding For	2	CY	3.72	B	45	16.00	32	0.40 - 1			
Manholos Compaded 74"- 2"											
Excavation for Manheles	41	Cr	0.86	B	212			1.21 = 5			
Using Bookhoe I Crap.								To make the property of the contract of the co			
Back Sill by hond Vib, Plate	9	CY	5.22	B	282		_	0.45			
Compaction 6" Lifts				·							
Trench - Excavation 600	n 315	LF	0.24	B	454			0.30 - 7			
- Bedlino	6	CY	2.68	В	96	5,00	30	0.27 -			
-Back fill Air Tom	29	CY	3,47	B	600			0.78 - =			
<u>Subtotal</u>					7.274		2,097	Z'			
					7.175						
Process Forcemain	•										
Pipe - PVC Containment 6	1,600	LF	-	Jack.	oded in erial total	85.00	136,000	Guste #5			
Valves - PUC Ball 4"	1	EA	18.49	8.	111	288.00					
- Diaphram - Noo-	1	EA	160.00	B	960		1,100	Just. #7			
prore Lined 6"											
Pipe Supporte: Total of 160							•				
Pipe Clamps Galv. 10"	160	FA	3.45	В	3,312	19.43	3/09				
Galv. Threodod Rod 1/2"	640	LF	1.28		4.916	0.38	243				
Concrete	83	CY			· 3' —	50.10	42254.174				
Forms - 4 uses	4.480	SFCA	5.10	BI	37088	0.85	3.808	0.22 - 760			
Concrete Flacement	83	CY	4.96		2470	0.31		0.31· ZC			
Subtotal			1	_	18,857	/	149,748	101:			

[&]quot;B" Designates Level B. Labor multiplied by factor of 6.

CONSTRUCTION COST	ESTIMA	TE		DATE	3/87	SHEET OF				
PROJECT						BASIS F	OR ESTIM	ATE		
BASIN F	•						•	. (No doc) reliminary	promotored	
RMA DANCE	i					. Tc] 6006 (: (Final do	et gri	
HDR	•					120	THER (Sp	-dh)	O P. Decor	
Pump Station'			A. A.	1, 1.	Z		CHECKE	FO	ICKSON	
	QUANT			LAB			MATERIA		Equipme	
Structural SUMMARY	NG. UNITS	UNIT		0	TOTAL	PER	70	TAL	COST	
Concrete (Div. 3)	·							•		
Slabs on Grade:										
Concrete - 4000 psi	11	CY				54.20		596	-	
Placino	11	CY	7,45	B	492			-	0,96 -	
WWF- 6×6 #4/4	5.95	CSF	13.10	8	468	20.20		120	-	
Edge Forms	136	LF	1.04	8	849	0.16		22	0.05 -	
Screed - 2x4	14	LF	0.69	B	58	0.79		11	0.04 -	
Finishing (Broom Finish)	595	SF	0.23	B	821			-	0.04 -	
Curing (Spraved Membrano)	5.95	CSF	2.71	8	97	1.70		10		
Equipment Pade:									and the second s	
Concrete - 4000 psi	,	CY				54.20		54		
WWF - 6 × 6 +4/4	0.48	1	13.16	B	28	20.20	10 -		_	
Placing	/	CY	7.45		45			-	1.46 -	
Forms	50	LF	1.09	B	312	0.16		8	0.05 -	
Finishina (Float Finish)	48	SF	0.22		63				0.04 -	
Curing (Sprayed Membrone)			2.71	B	8	1.70		1		
Anchor Bolts & 0 x 12"	8	EA	z.00		99	2.20		18	-	
£"ø×6°	. 12	EA			131,43	0.64		3		
					3,493			858	4	
					3481		430			
Metals (Div 5)										
Guardrails - Steel	14.5	LF	2.84		247	21.00		305		
- Painting	14.5	LF	0.50		44	0.50		7		
· - Anchor Bolts 4	20	EA	2.06		247	1.88		35		
-Bolt Layout & Drilling		EA	6.30		756	0.05		1		
					1,294			35/		
				·						
1) "B" Designates Le	v2/ B.	Lak	or Mu	Hip	lied by	facto	- of	6.		
9										

CONSTRUCTION COST	ESTIMA'	TE	`	DATE	PREPARED	SHEET OF					
PROJECT						BASIS FO	OR ESTIMATE				
BASINI F							COOK A (No decign				
ILOCATION ·	•					_	OS 8 (Preliminary d				
RMA Danger						1] 6906 6 (Final dee INER (Specify) / /	or Decia			
HOR							CHECKED BY				
HOR B = 5/4 inin			A K	يند ند .	lan		ACERIC	KSON			
PUMD STATION	QUART		. # A =		OR (M. H.)		MATERIAL				
Mechanical SUMMARY	NG.	UNIT		_	707 AL	PER	TOTAL	TATAL TRES			
Process	UMITS	MEAS.	UMIT	10		0					
Air Supolu Sustem											
Air Compressor -330 scfm	/	EA	24.0	B	144,0	17.300	17.500	Quate 3			
@ 125 ,2219											
Air Receiver - 120 ad	1	EA	2.0	8	12.0	842	842	Quate =			
Air Pisino (- Steel 2"	75	LE	0.15	8	157.5	2.13	160				
Hested 2 - Steel -3/4"	8	LF	0.10	8	4.8	0.67	5				
Prossure Reducing Value 2"	1	EA	0.70	B	4.2	260	260				
Ball Valves 1- Steel K"	1	EA	0.40	1	2.4	5.03	5				
- Steel 3/4	1	EA	0.40	Į	2.4	3.03	3				
throuble - Steel 1"	2	EA	2.50	2	6.0	10.46					
- Steel 2"	1	120	3.2	8	19.2	29.84					
Pipe Supports - Conc. Black	7	=A	1.0	E	420	1.47	9				
- Piza Clanes	7	EA	0.33	E	13.9	1.32	9				
Air Pains Fillim: FZ" Elbour		EA	0.33	B	53.7	4.61	51	•			
1-2" Unions	4	EA	0.94	12	22.6	10.40	42	•			
1-2"x1" Red.	2	EA	0.76		9.1	3.52	7				
1 - 1" Elbours		50	0.68	B	3.2	1.53	3				
threaded < -2"Tees	1	EA			8.7	6.25					
-1"Unions	. 2	EA		1	85	4.91					
= Flex Com	2	EA	0.42	A	6.7	23,00					
- 3/4" Union	1		0.65	4		ತನ್					
-3/4° E16,005	3	EA			11.0	1.25					
Pressure Relief Valve 3/2"	2	EA			5.0	19.30	32				
Subtotal					460.8		19.362				
20879731											
					•						
					•						
0 "0" 5 1	1 =		1.	ed . 1	1:- lied		-to5.6				
1) "B" Designates L	evei c	- 4	a por A	11314	7 7 7 7 9 4		Crop For Ol) 			
								والمراجعة والمراجعة			

CONSTRUCTION COST	ESTIMA"	TE		DATE	PREPARED 127	SHEET OF			
PROJECT						BASIS FO	OR ESTIMA	TE	
ZASIN F] cooe . ((No door e	n game leted)
LOCATION DME D	•						306 0 (Pm	-	_
RMA Donger] cooe c (x &		0% Desi-
HDR							CHECKED		1014 1001
Pumo Station			A. K	6+14	سطار				ICKSON
	QUANT			LABO			MATERIAL		TOTAL
Mechanical / SUMMARY Process	NG. UNITS	UNIT	PER	D'	OTAL (MH)	PER	707	AL	COST
					(77117				
Fluid Pumping System						6.600		170	
Disphroom Pomos-150gm		EA	3.2	18	33.4	8.338	16	,6/6	Queta #
@ 150 FT TON(P-101 2 10)									
Flex. Connections - Newprene 3	4	EA	1.5	E	26,0	259.00	/	036	
Quick Coucling -Str. Stl. 4"	2	EA	1.6	E	19.2	330.00		660	٠
Flex Suct. Hase W/str. Stl.	10	EA	1.5	8	90.0	530.45	5	305	Quate *
Orich Complies Fids - 4" 8×20"									
Pipo - PVC Sarkt 4"	12	1=	0.33	B	73.8	3,60		43	
File Contrinent 6°	20	4	_		es in mary		1.	700	Queto =
Pall Value - PVC = Lad4"	2	EA	2.92			288.00		576	Table of Fallen
	1	EA	7.32			1.100			
Diagram Whor Nesocare		= ~	1.16		<u></u>	7, 70			
Lined & Newmono Digitimen Fla	rood			!					
Pine Superate: Table of 2				<u> </u>					
Pier Clamas 10"	2	ΞA	0,115			19.43		3 0	and the
Golv. Threshed Rod 1/2	ε	LF	206	2		0.33		3	•
Garate	1.04	=7				50.70		53	
Forms - 1 .95e	56	SFCA	0.30	B	100.3	1.82		102	# Includes Fourte, Cos
Companie Placing	1.04		0.43		2.7	*0.49		1	* Eswinant
5.64561	•				374.2		27.	294	
ELECTRICAL									
	1500	F				_			15,677
REALCH TO COMP DAD	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								7,847
(IGHTING TO COMP. 740									<u> </u>
LAROR									8351
24hr/day for 25 WD	600	his	13.76	82	56	1			8256
	-								
			,						
1 B" Designates Leve	1 B.	400	or M	oithe	lied b	Fac	for of	6.	
					1				2.1 ⁹

Project: Hame: BASIN F
Location: DENVER
Quote #: / (Estimate Sht. No)
Firm: Hame: INGERSOLL - RAND
Location: OMAHA .
Telephone No.: (402) 330-5831
Person Talked To: STEVE ZIMMERLE
Type of Quote: K Supplier, material only (FOB Point: DENVER)
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
MODEL SSR EP 75
w/ · Reduced voltage starting
W/ Reduced voltage starting Protective shutdown annuciator
• TEFC motor
· Dust inlet
· · · · · · · · · · · · · · · · · · ·
electrical 460 y 3\$ 60HZ
\$17,800 ea

417,800 ea
Weight = 2350 4
·
•
•
Date Quote Received: 1/19/87

Project: Name: Basin F
Location: RMA Deaver
Quote #: 2 (Estimate Sht. No. /)
Firm: Name: CPT Sales
Location: Omeha
Telephone No.: (402) 334-73/7
Person . Talked To: Brad Baustend
Type of Quote: X Supplier, material only (FOB Point: Denver
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
Air Operated Diaphragm Pumps
Wilden Model M-15
Accessories & Options:
Non Wetted Parts: Cost Iron
Ball Valves: Neoprene
Value Seats: Neoprene
Diophraams: Neoprene
Oiler
Filter
Regulator
Polypropylene Surge Supressor
TOTAL COST FOB = \$4,165
Weight = 215 16 each
Date Quote Received: 1-19-87
Quote Received By: FURNE

Project: Name: RASIN E Location: DENIVEE
Quote #: 4 (Estimate Sht. No)
•
Firm: Hame: Ronger Rubber
Telephone No.: (402) 55/-2300
Person Talked To: John
Type of Quote: X Supplier, material only (FOB Point:)
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
4" Suction Hose w/ Str. Stl. quick couplings
All chemical type hose
20 ft lengths
Male x Female Couplings
\$ 530 45 Cach
•
,
•

Date Quote Received: 3-17-87

Quote Received By: D Kothwitz

Project: Name: BAS	SIN F
Location: D	ENVER
Quote #: 5	(Estimate Sht. No)
Firm: Name: Gartner	É Assoc. Co. Inc.
location: Omo	he NE
Telephone No.:_	(402) 572-6969
Person .Talked To	Rene Nelson
Type of Quote: X Sur	oplier, material only (FOB Point: Denver
•	contractor, material installed (Cost to Prime)
Scope/Description/Amoun	On the Control of the
	PROPOSAL
	BATT_2-270-67
Per phone conversation	TO NOR INFRASTRUCTURE MANKE OF TOB : Norve Agent disposal Denver Co. 8406 Indian Hills Drive Omehr. No. 68114-4049
3-19-87, determined	ACERS Thomas Furne
that \$65 /FT is	Two. confirming our phone conversation today is a list of some of the opecifics for the SAF-T-GAED styling system. I will send additional information as I receive. Thank you for your time and consideration. I will be in touch shortly.
price including	SAP-T-GARD CONTACHENT PIPING STSTEN:
mstallation excluding pipe supports.	6° sch40 PVC carrier gipe - selvent welded 10° sch40 PVC centainment gipe- PVC welded 2° polverethene femmed in place insulation 16° final system size with a flaished PVC outer casing, common stack couplings
•	MAT TALCING:
	The sising system shall be electrically heat tape traced. The heat tape and an alunium wrap to prevent het spets will be installed in a continue manner around the containment sipe before the insulation is feemed in place. The electrical connection point will be a Mid Food System reaching out 1000 foot on either side. Thermostat(s) included. Values to hydractic, size to be elarified. Heat tape to be designed for ammirent immerature of 20°F and to maintain fluid at 80°, entering siging system at 55°.
	MENTAL MINING
	Lank detection — suspe with sight glass, drain valve. Spacing as required. Expansion joints— flamped measureme type. As required. Elbows and too or "I" fittings -factory fabricated.PVC ball valves: Carrier pipe suspects -internal to the piping system Baffles internal to the piping system
	PIPING STSTEM SUPPORTS:
•	To be field erected by others (Concrete polistale, "U" straps)
•	Estimate price to include material, freight to job site, field service instructions \$ 55.00 per feet
Date Quote Received:	2-20-87
Quote Received By:	

Project: Name: BASIN F
Location: RMA Denver
Quote #: 6 (Estimate Sht. No.)
Firm: Hame: INGEROLL - RAND
Location: OMAHA , NEBRASKA
Telephone No.: (402) 330-583/
Person .Talked To: Steve Eimmerk
Type of Quote: X Supplier, material only (FOB Point: Denver
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
Model VCG2412 Air Receiver 120 gal Coast Guard Approved Epoxy Coated \$842 FOB Denver Weight =
•
•
•

Date Quote Received: 3-17-87

Quote Received By: D.A. Kottuitz

Project: Name: BASIN F
Location: DENVEL
Quote #: 7 :(Estimate Sht. No)
Firm: Hame: Central States Industrial Supply, Inc.
Location: Omaha, NE
Telephone No.: (402) 344-8900
Person Talked To: Keill
Type of Quote: X . Supplier, material only (FOB Point: Denver
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
6" Sounders Straight Thru Diaphragm Value with neoprene lining and neoprene diaphragm. Weight = 250 16.
\$1100 FOB Denver
•
•
•
•
•
•
Date Quote Received: 3-18-87
Quote Received By: DA. Kottwitz

me affenendenen & neben belieben Beite.

1. W. W. 18. 1.

- Sewer and Miscellaneous Debris Removal (Compaction in Waste Pile)
- Haul Waste to Waste Pile (Compaction in Waste Pile)

CRI	W AND PRODUCT	IVITY WO	RKSHEET		DATE PREPAR	EE
For use of thi	s form, see TM 5-800-2			CE	3-18-	
RMA				D. HAWK		CREW REF N
DENVER,	Co.	•		T. Kelle	3-12-87	
		CREW	COMPOSITION		/	
WORK TYPE	WORK SCHEDULE			BASIN F TE		
			LAI	OR COST		NT COST
CREW DESCRIP	PTION .	NO. REQUIRED IN CREW	HOURLY® RATE (8/HR)	TOTAL FOR CREW (S/HR)	MOURLY RATE (S/HR)	TOTAL FOR CREW (8/MR)
CAT 627 B SCR	APERS	4	1703	6812	11777	47108
CAT D8L De		2	1685	3376	106.37	2/2 24
CAT DG DO		1	1688	1688	4640	46 40
CAT 14 G MO.		1.	1703	1703	756!	7561
MRS 1-1005 TA	eactor w/disc	1	1688	1688	832	839
LABORERS.		2	1276	25 52		
CAT 627 B SCRA	RERS (STANDBY)	1			75 37	75 37
			· ·			
•						
TOTALS .	. MANHOURS	11	LABOR	178-17	EQUIPMENT COST	964 29
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	. L	S/UNIT	EQUIPMENT \$/UNIT	COMM	ENTS
EXCAVATION HAULING	404 CY/HR		"044/cy	4 2 39/cy		•
SAFET.Y	404 c//42		40 39/cy	4 0 86/cy		•
Total Equipment, Labor & Sapety					> #4º	8/cy
Including fringe benefits						

DA FORM 5419-R, Apr 85

C Ser us of	REW AND PRODUCT	IVITY WO	RKSHEET	cs	3-18	EC -87
PROJECT	•			D. HAU		CREW REF NO
LOCATION DEN VET	e, Co	•		T. Keiley	3-18-27	
WORK TYPE	WORK SCHEDULE		COMPOSITION	SPECIAL INFORMA	TION SCUBLE	HANDLING
SAFETY				BASIN F	TO SOLIDIF	ICATION FACILITY
		NO.	LAI	BOR COST	EQUIPM	ENT COST
CREW DESCI	GREW DESCRIPTION '		HOURLY* RATE (\$/HR)	FOR CREW (S/HR)	MOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
HEAVY Equi	PM6N4	9 .	-	-	3820	343 80
STANDBY HEAD	14 EquipMENT	1			4.45	445
LABORERS		2	7805	156 12		
,			•			
						The Control of the Co
						
·			•			Carolina (and an
			· · · · · · · · · · · · · · · · · · ·			
TOTALS	MANHOURS		LABOR COST	15610	EQUIPMENT COST	34825
		CREW PA	IODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	SUNIT	EQUIPMENT \$/UNIT	COMM	ENTS
SAFETY	404 CY/4E		"031/cy	086/cy		•
						•
·	-					•
Including fringe penefits DA FORM 5419-R, Apr 65						

Subje	ect Landfill construct	tion - S/	dge reneval costs.	Project No. <u>86 C 8554 P</u>
				Task No. 2
Ву	TEK	Checked B	y D. HAWK	File No. 21947
Date	3/16/87	Date	3/13/87	Sheet/ of _5
	SLUDGE HANDLI	AHA DH	HAULING BASIN F	TO SOLIDIFICATION
	This work excavating to solidification	will inco final area.	lude mixing and o grade and have	rying sludge,
	T.+ is execuate ma load scrapers execuste belo will be used F to the so it was assumed the sludge could 20% whereas how! roads the how!. It the how!. It	envision terial constraint to had to had indifficult indifficult that portion to portion	ned that Dozers youn to liner of liner to the finition area wather tion area wather hey'd be more notions of the exception of the exception of the exception of the instance of 1109 wated that mixing chieved by discinct and a light decreased for main	will be used to rade and to push will be used to shed grade. Somers ends from Busing than trucks as
	,	reduct	ion for the excav	ention fleet should
	roughly ments	L that	of the solidit	cation fleet should cation Proposition
				and the same of th
		A THE RESIDENCE OF THE PARTY OF		na an h i a a an
		, ,		
-		- :		
1 -				
			<u> </u>	

1 -- 1

Y TEK		Checked By	Sleedig-King- D. HAWK	Task No	
			3/13/87	File No.	2194 4 2of_5
ate 3//6/87		Date -		Sheet	of 2
REDUIZEN	PRODUCT	inu:			
		107			
_			THAT THE PL		
	-	,	thr. and wil	L OPERATE	14 hours a
day	PRODUCTI		·		
·	PUG	FMILL PR	ODUCTION =	300 cy/h x K	1 hrs/ = 4,200
					racy
	T & 1	TEDALE	F BANK CUBIC	YADNE .	
	17	1		(17,03)	
		(0.8	LF) P	UG MILL	Lawf"
			× (+10% byvali) 	1/1/4
		excavate /	11.		
	- 1				
Vol. of 3375	ilbs sludge: f	-1cy-+	1.25cy	/.37cy _	
	f	, ,	7.2529	,,,,,	
	, As h 90 ,		Pay Pardud	·~ = 4700	cy / 16cv
•			BCY Product	705 = 7,000	dy (1.37cy)
					2 -61 bcv/
					3,066 bcy/day
	For	Exc ALATI	ON CREW@81	hours per do	
	, , ,	CACAOTTI		boo s per es	
			3066 bcy (Iday > -	383 byd 3/
	areas who the tr				
			ady (81-ours)	hr.
				8hours)	hr.
				Bloves)	hr.
				Bloves)	hr.
				Bloves)	<u>hr.</u>
				Bloves)	<u>hr.</u>
				Bloves)	hr
				Bloves)	hr.
				Bloves)	hr.
				Bloves)	hr
				81-ours)	hr

TEK	Checked By	y D. HAWK	Task No. 2 File No. 21947
-1: 127	-	3/18/87	
e 3/16/87	Date	3/10/0/	Sheet <u>3</u> of <u>5</u>
-			
ESTIMATED C	YCLE TIMES		,
	DRACH F (CAT	- / 77 D SADEI	2) -Dan BATTA MOF
HAUL	PROFILE WAT	BATE SCKATE	R) FROM BOTTO M OF EA . ASSUME PROFILE
YC: F	SCENTIALLY TU	E SAME AS TH	AT FOR SLUDGE
Exca	NO NATIALITATION	HAULING TO ST	TOCKPILE EXCEPT AVER
			T MANUEUERING = 1900
	SHOWH BELOW		
a superantended to a relation to the territories	A STATE OF THE STA		•
			D E 300'
		C	200
A	1	900'	3 290 GR = 0 96
	200' 62: 24°	G-2=090	RR=10% RR=10%
300' GR=09		RR=1090	
18 E = 10			
A			
		LOADED	LUL COADED
HAUL LEG	LENGTH .	TR TIME	TR TIME
Δ	300′	10% 0.39	1090 0.32
	200'	129. 0.35	890 0.34
B	900'	109. 1.72	10% 0.76
P		1290 035	890 0.24
<u> </u>	300'	10% 0.39	1090 0.32
Tor	AL TIME	2.60 min.	1.88 min.
		T	1. 2.02 min.
TOTA	L ESTIMATED	CYCLE TIME	
1 :	HAUL		2.80
	RETURN		2.02
	LOAD		0.8
	MAHUEV	ER AND DUMP	0.8
			1 47
			6.42 min/cycle (10
•	1		The state of the s
	1		

Subject Landfin Co	Checked By	D. HAWK	Task No	(-
Date 3/16/87	Date 3	1/8/87	Sheet 4	01
ESTIMATED	PRODUCTION			
DESTIN	NATED LOAD	OB ASSUMED	LOAD FACTOR	
	/8 (2 y x 0.8 L.F	. = 14.4bcy/LOA.	DV
2) CYC	LLES PER HOU		$\left(\frac{2}{m.n.}\right) = 19.34$	cycles/hour.
3) AD.	JUSTED HOURLY	Y UNIT PROS	DUCTION (45min)	hr. forlev-1B)
	(45 min)	9.34 cycles/h.	r.) 14.4bcy/LOAD) = 100.9c//2
4) NE	ED 383 bcy/4			
		383 y/hr.	= 3.80 / use 4 scrape	
				rs
5) CHEC	K PUSH DOZ	ER BALANCE		
	Pot	ER CYCLE	1.4(0.8) +0.25 =	1.37minute
		R CYCLE = G	0.42 min = 4.6	9. 1
	Jo USE	L DOZER, T	O HANDLE 4 S	CRAPERS V
6) ELEE	T PROPUCTION	N G LEVELB E	FFICIENCY (45m	nin/hr)
		4 × 100	gbcy/hr. = 403.1	Beylhr.
	77			
1)			

EQUIPMENT AND FLEET COSTS: ### CAT 627B SCRAPERS @#13480 = # 53925 / ### CAT D-BL DOZERS @#12325 = # 24650 / CAT 627B SCRAPER	By TE k Date 3/16/87	Checked By D. HAWK Date 3/18/87	Task No. 2 1947 Sheet 5 of 5
Cost	EQUIPMEN	TAND FLEET COSTS: CAT 627B SCRAPER CAT D-BL DOZERS CAT 627B SCRAPER (STANDBY CAT 14G MOTOR GRA CAT D-6 DOZER & 6 TRACTOR WITH DISC. ATTACHME	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	Cost:	# 1,1.42 48/HR = 403.60cy/HR V	

Haul Waste to Waste Pile

	W AND PRODUCT				3-18-	et 07
PROJECT	form, see TM 5-800-2	. The propone	nt eponcy is USA	PREPARED BY		CREW REF NO
RMA LOCATION				D. HALL		·
DENVER,	Co.			T. Kelle	y 3.18-87	
		CREW	COMPOSITION	•		
WORK TYPE GRADMY /COMPACTING	WORK SCHEDULE			GRADE AND		
		LA	OR COST		NT COST	
CREW DESCRIP	TION	NO. REQUIRED IN CREW	HOURLY® RATE (B/HR)	FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
CAT 825 C C	OMPACTOR.	1	1688	1688	9052	90₹
CAT DOL I		1	1688	1688	106.37	10637
		7	LABOR	33 7k	EQUIPMENT	121 89
TOTALS	MANHOURS	2	COST	33 12	COST	1.96 89
	PRODUCTIVITY		LEOR			
WORK TASK	RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT \$/UNIT	сомм	ENTS
GRADING/COMPACTION	383 CY/HR		009/ex			•
SAFETY.			د د د د د د د د د د د د د د د د د د د	#020/CY		•
					,	
Total Equipments LLAGE & SAFETY	-				- *02	² /c4
·	-					•

For use of	REW AND PRODUCT this form, see TM 5-800-	2: the propone	IKSMEE I nt agen cy 4 US	ACE.	3-18-	
RMA	•			PREPAREDRY		CREW REF NO
CATION		D. HAL		ł ·		
DEN VER	, Co.	·		T. Kelle	y 3.18.87	
		CREW	COMPOSITION			
ak type Safety	WORK SCHEDULE			SPECIAL INFORM	ATION	
DAFETT			LA	SOR COST	EQUIPM	ENT COST
CREW DESC	NO. REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)	
TEAVY EquIP	MENT	2		•	3820	76 40.
			•			
						To state at
·						
TOTALS	MANHOURS		LABOR		EQUIPMENT COST	7640
		CREW PR	ODUCTIVITY			
WORK TASK	PRODUCTIVITY	LA	80R	EQUIPMENT		
	UNIT/HR	MH/UNIT	S/UNIT	\$/UNIT	COMM	ENTS
SAFETY	383 c/4R			02º/cy		
· · · · · · · · · · · · · · · · · · ·						•
	•					
	1	1		1		•

...)

	ect <u>for</u> TEK	og.	~ ====			D. H	. /	[.	Tas	k No		8554 ^F	
Date	3/17/	/a.z				18/87			She	et	/	of 2	
		1		;	: ; .	7-7-1					- C		
	GRA	DE /	AND	PLACE	WAST	EIH	LANE	FILL					
		7	tie c	rock	6011	include	/ SD	en de		F He	solie	dified	,
	n	ater	ial	dump	ed by	the	Scro	pers	1, 0	مط د	مرسد	dified cting	
	ir	th	e la	ndfil.	10-	- -		+		<u> </u>	i		
			I+ is	assu	med	that	ביים	bzer	will	spre	ad t	he	
	n	rateri	al, to	o gro	de a	da	ompo	ictor	will	com	act :	he the e used	
	h A	e so	ial_s	W. In. 5.	one	_pxss	٢	wo le	abore!	5 4	21 []	e wed	
		1									•		
	Pi	rodu	ction	Sho	uld	rough	hly ,	nate	h	nat c	of the	he to the	
-		eraf	ers '// (5	25 Cy.	lad or	me 1 -383	5 bev	(br)	ed m	areri	a1 7	-0 776	
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Subject Langil Cost -	fandfull o	Ling and Com	Alerroject No. <u>86</u>	C8554P
Subject Lingfill Costs - By TEK	Checked B	y D. HAWK	Task No.)
)ate 3/17/87	Date	3/18/87	Sheet	of
REQUIRED -	RODUCTION	U -		
	hourly prod.	= 525 c.y. /hr. (383 Dey/hr.)
	Scraper cy	= 525 c.y. /hr. (cle = 1483 min . Iscraper ever)	@ 1009 a effic	iency
	4.5cmpers	iscraper every	(_I.Almin	
CHECK COM	PACTOR PR	SODUCTION:		
	CAT 825 C	Performance; 3pe	s Amph Si	ch lifts.
	from CAT Perfori	mance produce	tion = 1283 y	d3/hr.
and the second contract of the second	•	Handbook) 1283	tion = 1283 y	differ.
1 · ·			1 compactor	
La Carrier again and the management of the		and the second s	D-S DOZER	
				- M dv d Na - makern kapr or the
FLEET COST		<u></u>		
1 CA	T 825C	compactor &	#10740 =	10740
10	9T D-8	compactor @	123 25 = B	12325
·				V
			<u> </u>	230 5/HR.
				3 3
COST #2	3065/hr.			
5,	5 cy thr.	= \$0.44/c.y.	ن ا	1 :
	ocy. Thr.			
	245			
\$25	0.55 /hr.	= \$0.60 /bcy		
43	03 bcy/bc			
# Note:	No safety	considerations	taken into ac	count
		cost except 4		
				<u> </u>

Solidification

CRE	W AND PRODUCT	IVITY WA	DYCHEET		I DATE PREPAR	e :
	form, see TM 5-800-2			CE.	3-18-8	
PROJECT RMA		PREPARED BY D. HAWK		CREW REF NO		
LOCATION DENVER,	Co.		CHECKED BY	1104 3-18-8	2	
		CREW	COMPOSITION		,	
WORK TYPE EXCAVATION HAULING	WORK SCHEDULE			SOLIDIFICATION		
Zandy Arton / / / Abbling			1 141	OR COST		ENT COST
CREW DESCRIP	NO. MEQUIMED IN CREW	HOUSE	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)	
CAT 627 B S	raders	4	1703	6812	11727	47108
CAT DEL DOE	. 1	16 38	16 88	106 37	106 37	
CAT 966D LO	ADERS	Z	1688	3376	6110	12230
LABORERS		2	12 26	2552		
CAT 6273 SCRAP	ers (Standby)	1			7537	7537
						10.0000
						~ 17 (MA) (* *
						and the second of
·						•
·						
TOTALS	MANHOURS	9	LASOR COST	144 28	EQUIPMENT COST	7.7502
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY BATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
EXCAVATION / HAULING	383 cy/42		# 0 35/cy	1202/cy		•
SAFETY.	383 CY/HE		*041/cy	*0 ²¹ /ey		•
TOTAL EQUIPMENT WITH					- # 6	
LABOR & SAFETY					> *35	/cy
						·
*Including fringe benefits						
menaguil mude beneuth						4

(:,)

	REW AND PRODUCT	TIVITY WO	RKCHEET		DATE PREPAR	F. P.
For use of	this form, see TM 5-800-	2: the preson	ent apency is USA	CE.	3-18-	
PROJECT	•			D. HAW	•	CREW REF NO
LOCATION DEN VE		0.100400.011	3-18-87	٠		
DERVE		CREW	COMPOSITION	1. Keile.	3318-01	
WORK TYPE	WORK SCHEDULE		COM COLLICIA	SPECIAL INFORMA	TION SULVE	HANDLING
SAFETY			~	SOLIDIFICATION	FACILITY TO L	ANDFILL
		NO.		OR COST	EQUIPMI	ENT COST
CREW DESCRIPTION .		REQUIRED IN CREW	HOURLY® RATE (E/HR)	TOTAL FOR CREW (B/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY EQUIP	MENT	7			3820	26740 445
STANDOY HEA	VY EQUIPMENT		<u>-</u>	<u> </u>	445	445
LABORERS		2	7805	156.10		
•	•		•			
		·	٠			
					·	
· <u>· · · · · · · · · · · · · · · · · · </u>						
	·		,			
			·			:
TOTALS	MANHOURS		LASOR	156	EQUIPMENT COST	27/85
		CREWP	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	Сомм	ENTS
SAFETY	383 EV/HR		*04/cy	*0 ⁷¹ /ex		
·	•					•
*Including fringe benefits						•
						

Subje	ect Janefill Cost	s -sa(idi.	ficution to faudfill	Project No. 8603554
3y T	TEK	Checked By	D. Hawk	Task No. 2
				File No. <u>21947</u> Sheet of4
)ate	3/16/87	Date	3/18/87	Sheetot
	6			40554
	SLUDGE HAULING	-SoulDif	ICATION AREA TO L	ARUFICE
•	This work	will inch	de loading mater	ial from the solit,
	sludge stockpik	at the int	Rymill into Sci he landfill.	rapers and havling
	It is assu	imed the	at loaders will b	e used to top loud le material to the lassist the loaders.
	Scrapers. Scra	apers w	111 then haul th	e material to the
	land filland	dump it.	AD-8 DOZER WIL	lassist the loaders.
	2 laborers will b	20 USCd CI	s spotters	
	baily pro	tout or	of the fleet the pug mill.	Should roughly
	match the of	ripor of	The pag min.	/ /
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			La Company Com	- 1
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	and the state of t			
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Subject Jandfill By TEK Date 3/6/87	Checked By	ification to landfill D. Hmux 3/18/87	Project No. <u>ECCE554P</u> Task No. <u>2</u> File No. <u>21947</u> Sheet <u>2</u> of <u>4</u>
			UI UI
REQUIRED PROD			/. / / //)
1			y/day (3066 bcy/day)
Adju	isted Landl	Fill hauling Fleet	production for = 525 cy/hr
		(525 ÷ 1.37) =	(383 bcy/hr)
ESTIMATED CYC	LE TIMES		
HAUL F		T 627B SCRAPERS E 1.000ft with M) AVG. HAUL = 800 T.
400' C106	rR.	B C 20 39. GR 39. RP 39.	
SECTION	4.4	LOADED TR TIME(m.	UNLOADED TR TIME (min.)
AB	400'	10% .54	10% .4.1 6% .34
C	. 200'.	3% .25	: 39619
C 9390 alt	_	in 1.13 min	
LOAD	TCLE		
	- For Acy by	cket 8:1.0 Load	min. additional loads factor = 40 cy/LOAD
	0.2 +4(0	er vol.) (4.0 cy/loo (4) = 1.8 min / (oxo	u) = 4.5 passes of karly(se
		a contract to a transfer and a second and a contract to the co	5000' a (titude.)

Subject Landill Costs - S	olidification to far offil	Project No. 86C 8554 P
By TEK	Checked By D. Hawk	Task No. 2
Date 3//6/27	Date 3/18/87	File No. 21947 Sheet 3 of 4
TOTAL EST	IMATED CYCLE TIME	
	HAUL RETURU_ LOAD	1.22 min. V 1.01 min. V
	MANUFUER & DUMP	0.8min :
		4.83min/cycle @ 100% eff.
ESTIMATED	PRODUCTION:	
i) Es	STIMATED LOAD (1.4	Passumed load factor)
	18 cy/10ad x 1.0	O L.F. = 18.0 Cy/LOAD
2)	cycles pertour (60min/hr.) 1cm	23m) = 12.4 cycles/hour.
3) A	lajusted Hourly Unit Pr	oduction (45min/Ar. for level 3) v
	(45 min/60 min)(12.4 cycles/hr)(18.0cy/load)
		= 167.4 cy/hr/mi
4) /	NEED 525 CY/hr. (Loose)	
5) c	Leck loader balance	The second secon
		4.83 min = 2.68 Screpers 1.8 min = loader 1.8 min = 2.68 Screpers 1.8 min = 2.68 Screpers
6) FLE		Befficiency (45 min/hr.)
	4x 167.4 CY/hr./un	+ = 669.6 CY/hr.
<u></u>	= (383bcy \ (525cy)	Woodward-Clyde Consultants

bject Safell (
TEK	Checked	By D. HAWK	Task No.
			File No. 21947
te 3/16/87	Date	3/18/87	Sheet 4 of 4
4.00	L02R •	scrupers @ \$134	± ± 539 ²⁰ /
/ Cat	627B	enher (stardby) @ 18	57537 = #7537V
2 Cat	966D Po	robber G\$77	98 = \$15596
1. Cat	D-8 D	bzer @\$/2325	\$7537 = \$7537 \ 98 = \$75596 \ = \$92325 \ = \$2552 \
2 Kol	ores	G \$17 15	= # 25 52/
	•	TOTAL HOURLY	\$91930 /
· · · · · · · · · · · · · · · · · · ·	•		
COST P			•
COST PE			
# (B = 20	1 1/-0-	-cu/ > # 1	75
(791930)	1 11 525	$-\frac{1}{2}$	- / c.y. v
# (#919 <u>30</u>)	hr.) (525	1/hr.) = 1	75/c.y. V
•	•		•
•	•		•
•	•	$\frac{\langle y hr.\rangle}{\langle xy hr\rangle} = \frac{240}{240}$	1 /bcy / USE THIS PRICE BASED
•	•		•
•	•		2 /bcy VEE THIS PRICE BASED BCY EXCHUAT
•	•		PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLIDIFICATION
	•		PRICE BASED BCY EXCHUAT THIS WILL INC. 10% ADDITION
•	•		PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLIDIFICATION
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLIDIFICATION
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO
*(*91930/hr	:)/(383.4	$(xy/hr) = \frac{240}{2}$	PRICE BASED BCY EXCHUAT THIS WILL INC 10% ADDITION SOLDIFICATION MATERIAL (VO

•		•		RECEIVED 3/2	18/87	FROM HDR -	Σν# ·
CONSTRUCTION COST	ESTIMA	TE		DATE PREPARES			1 01 /
CHOJECT				-/2		OR ESTIMATE	
BASINF -PMA						_ CDD & A (No deer	gn emmeleted)
Denvæ, Co						OOK & (Proliminary	=
ARCHITECT ENGINEER	•					THER (Specify)	
DRAWING NO.	or 6x	ESTI	Level	R		CHECKED BY	Op Design
•			KOTT	WITZ-GRA	AC HEK		CKSON
Absorption System Summary	THAUD	_		LABOR		MATERIAL	TOTAL
	MO. UNITS	UNIT		TOTAL	UNIT	TOTAL	COST
WOOD WALL							
2x4 Frame	260	LF.	1.68	4.436	0.24	634	5070
te" Plywood	2160	SF	1.26	2722	0.41	886	3608
Na:15	100	16	_		0.48	48	48
Evacusion Anchors	60	Ēa	11.82	710	2.65	159	869
STEWORK						SUBTOTAL	9595 V
2" FVC Water	255	LF	13.00	3,315	8.33		5,439
Incomming Power	4000	CF.	_	75.202	—	103,550	178.75
Sump Execution	1000	CF	1.98	1,980	0.25	250	2,230
-Conemte	4	CY	437.4	1,750	70	280	2,030
- Formwork	400	<=	23.04	9,216	1.49	596	9,812
FOURMENT						SUBTOTAL	
Flu Ash Tonks	2	Ea	24,000	48,000	40,000		128,000
Puo Mills	3	45		10,000		96.000	106,000
	4.	Ēa	1.7.00	4.200	7000	8,000	12,800
- Electrical '				5856		565	6,421
Part Commune (Ell)	240	LE	100	24,000	750	180,000	204,00
Relt Conveyor (Pilot)	120	CF	100	12,000	600	72,000	84,00
- Fleetrical	·		-	12,700		7.300	20,000
Lighting (Abs + Pomost.)		45		28,098	_	9,004	37,102
Potery Freders							377102
- Freders, Motor	()	Ea	1,800	5.400	1385	4155	9,555
- VFD 3HP	3	Ea	402	1,206	1538	4,614	
Dust Control System				,	, 0.0	•	5,820
- Cyclone	1	Ea		5.000		12,000	17,000
- 3 lower	. 1	Eal		1560		2,800	4,360
- Flortrice	1	Ea		450		800	
						SUBTOTAL	1,200
SUBTOTAL PG 1				258,351		585,765	,

ENG PORM 150

· VI GOVERNMENT PROFIT OFFICE STREET

CONSTRUCTION COST	ESTIMA	TE		3/87	,	SHEET	2 . 2
PROJECT			•			OR ESTIMATE	
BASIN F-RMA] cook & (No doo.	gn essensioned)
DENVEZ, CO					0	OOE & (Proliminary	
ARCHITECT ENGINEER	•					COOR C (FMa) do	enter)
DRAWING NO.			ROTAN				2010 Desig
•				TZ - GRACI	HEK	AL EX	ICKTORI
Abs. an Tall days	THAUP			LABOR		MATERIAL	
ADSORPTION AREA SUMMARY	NO. UNITS	UNIT		TOTAL	PER	TOTAL	TOTA
Ammonia Scrubber System						·	
- Sembber	1	Ea		10.000		15,000	25,00
- ALMOS, A DING.	1	Ea		30880		31,174	62,05
- Blower	1	Ea		1560	ļ	4,500	6,06
- Electrical ·		Ea		400		800	1,200
OPERATIONS						SUBTOTAL	94315
Chemirals							
- Ely Ash	40,000	CY			25.70	1, 148,000	1,148,0
- H2 SO4	5000	501			0.76	3,800	3,80
- NaC10	400	<u>S1</u>			0.90	360	360
- NaOH	500	Gal	. —		1.02	510	510
	230			DEMPNO CHRISE		SUBTOTAL	115267
Flectrical Dower	720,000	_	4700/	28,200	0.06	43,200	71,400
Manzower						SUBTOTAL	71,400
5 Equil Oceanions	15600	hrs	17.18	268,008			268,00
2 Laborers	6240						85.8
1 Pus Mill Coerafor		hrs	16.88	52,666			52.6
1 Flu Ash oserator	3120	412	16.88	52,666			52,64
Equipment	٠					SUBTOTAL	459,20.
4 Loaders 13047	5320	hr.	-		61.10	508,352	508,35
1 Dozer HOH?	2080	hrs			46.40	96,512	96,51
CAP OUTLAY COST	1	د2				66,000	66,00
Abs. Maint Cost	1	LS				67.500	67,50
CONIC SLAB	- 1	دع		329,422	LS	83,816.	4/3,23
SUBTOTAL PG Z	-			859,664		2,069,524	2,929,18
SUBTOTAL PG 1				258,351		585,765	844,116
TOTAL				1,118,015		2,655,289	3,773,3¢

CONSTRUCTION COST I	ESTIMAT	Ē		DAT	Z PREPAGED	7	SHEET	1 0, 2
TOSLORD		-				BASIS FO	R ESTIMATE	
RMA] cook & (No door gr	
DENVER, CO	•					<u> </u>	DOE 8 (Proliminary de] COOR C (Final deal	60%2
						. <u> </u>	ruen (Specity)	FRICK.
WCC/ HOR							CHECKED BY	
DRAWING NO.		EST IM.	ATON E	R	YE			
	QUANTI	TY		_	80R		MATERIAL	TOTAL
SUMMARY	NO. UNITS	UNIT	PER		707AL	PER	TOTAL	COST
GROUND SLAB			<i>a</i> .					<i>C</i> 2 <i>C</i> =
125' x100' + B" 0.75	12.500	SF	70,410	B	34.500	7.44	72 000	52,50
Petar								
24'3 - [(34x 125'x 0.668 16/54) +	5,74	Ton	305	В	10.504	505	2,899	13,40
(67x100' = 0.669 16/22)7								
1=000/6/c = 5.74 T								
Wall							1015	16,190
(31 Hial v1==+ 100+100) x 2.57)	24.2	ICY	99	18	14375	75	1,815	16,110
129 = 24.19 cx								
	200		230	B	214	505	298	1112
=5'5 525 x 3.5'x 1.04216/02 /@reoil	0.59		230	A.	455	1		622
# 44 31225' = 0. Ma 15/6+ / = 200 15	10.33	1707						an actions Co.
Emily Hall								
100 x100 x 4"	10.000				7.5 PX			32900
liter WWF- 15" 16" 44/2	125	حري	13.10	3	9.825	29.20	2,525	12,35
three slab								
125 x 125 x 19/12	15.1.25	SF	0.49	8	45 932	1.80	25.125	74,06
#414 (= (B4 x125 , 0. 668 14) /2mm	7.01	Ton	305	B	. 12,828	505	3,590	16,36
	102	CY	99	8	11.464	75	1,448	12,9
What (125 x 5 x 19/-) /=7 = 19.3	19.3	107	77		77, 70 -			
1/3 x 125 x 0.663 /2000) +	0.54	Ton	230	B	745	505	273	1,018
=125 x 5.5 x 0.664/2000) = 0.54T	0.0,							
Finishing				0				E2 /2
(125 x 125)+ (125 x 100)+(125 x 100) =	40,625			1	53,625	1	100	53,62
Curian No. 625/100	406	CSF	2.71	B	6.602	1.10	690	7,25
		L		<u> </u>				

CONSTRUCTION COST	ESTIMAT	ΓE		DAT	3/87			SHEET	2	0,2
PROJECT						BASIS FO	A ESTIMA	TE		
RMA						_	C006 A			
Denver Co	•						06 8 (Pn			n)
ARCHITECT ENGINEER	•						HER (SP	dfr)	41	ERICK
WCC/HPR		ESTIM	ATOR				CHECKES	ign -	-	ERICH
DRAWING NO. /			FUR	en	E					
	THAUP	ITY			BOR	1	MATERIAL	·	4	TOTAL
SUMMARY	NG. UNITS	UNIT	PER		TOTAL	PER	707	AL		COST
Conc. Curb 125'long	125	LF	3.51	B	7,633	2.90		363		2996
3									<u> </u>	
Footinos concrete	14B	CY	28	8	24 364	68	10	0,064		34,928
Rehard	6.25	Ton	330	8	12.375	500		3,125	1_	15,500
			·						<u> </u>	
Forms Elec	900	LF	1.04	E	5/0110	0.16		144	_	5,760
Forms Edge Footing	ROD	SFCA	1.27	E	6.096	0.31		242	↓_	6.344
walls									_	
2/125×5)+2(125×3)	2000	EFLA	4.07	9	43, 240	1.20		2400	1	5124
Excavation	940	1	0.27	3	1523	2,63		<i>5</i> 92		2.115
BXCLVaxion	920		7.07		329422			3816	- (413,2
				1	351,100				T	
		 		-					\top	All (Miles also regions)
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Haul Roads (Level B)

	W AND PRODUCT				DATE PREPAR	ec 18/87
PROJECT RMA	10rm, 10c 1 m 9-900-2	. the present	INT SPENCY & USA	PREPARED BY		CREW REF NO
LOCATION	_			CHECKED BY	ELLEY	
DEHVER	,0			D. Haur	<u> 3/18/87</u>	•
·		CREW	COMPOSITION		•	
WORK TYPE EXCAVATION PLACEMENT	WORK SCHEDULE			SPECIAL INFORMA	LEVEL B	AREAS .
			LAB	OR COST		ENT COST
CREW DESCRIP	TION	NO. REQUIRED IN CREW	HOURLY' RATE (S/HR)	FOR CREW (S/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
CAT D-8 E	DOZER	2	1688	33 76	10637	212 24.
CAT 966 L	DADER	1	1688	1688	6110	610
18 CUBIC TARD ENE	DUMP TRUCK	3	1709	5/22	4118	12354
CAT 14G MOTO			1703	1703	7561	7561
LABORERS		2	1276	2552		
·						
				·		
•						
				·		· .
TOTALS	MANHOURS	9	LABOR COST	144 46	EQUIPMENT COST	472 99
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT E/UNIT	COMM	IENTS
EXCAUATION/PLACEMENT	317 ccy/20		* 0 46/cm	1 49/cy		•
SAFETY	317ccy/hr.		*0 49/cy	084/cy		•
MATERIALS DELIVEDED TO STOCKPILE				\$805/en	-	
=				/ = /		
TOTAL EQUIPMENT					#// 3	3 <u>3</u> /ccy ~
- ,					()	, -0,
						•
* including fringe benefits				I		

(/:

و میں بند و	CREW AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	EC C
PROJECT	1 this form, see TM 5-800	·2: the praser	wint aponcy is USA	PREPARED BY	3-,	18-87
RMA			~	T. k	KELLEY	J .
	ERICO	•		CHECKED BY	x 3/18/87	
		PREM	COMPOSITION	- INAU	2/148/	1
WORK TYPE	WORK SCHEDUL			SPECIAL INFORMA	TICH	5-45-5
SAFETY					EVEL B	AREAS.
٠		NO.	-	SOR COST		ENT COST
CREW DES	CRIPTION	PROUPER IN CREW		FOR CREW (S/HR)	MOURLY RATE (S/HR)	FOR CREW (S/HR)
HEAVY EQUI	PMENT	7			3820.	26740
LABORERS	•	2	7805	15619		
	•		٠			
· ·			٠			
TOTALS	MANHOURS		LABOR COST	156'21	EQUIPMENT COST	2.67 40
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY	MH/UNIT	ABOR S/UNIT	EQUIPMENT	COMM	ENTS
SAFETY	317 ccy/hr.		*049/cy	84/ -	·	•
	JAV.		· /cy	O =/cy		
•	<u> </u>				· · · · · · · · · · · · · · · · · · ·	•
	-	·				
Including fringe benefits						

Subject End fill Constr	Tution-fevel Bhaul Roal Co	TProject No. <u>86C 8554 P</u>
BYTEK	Checked By D. Hawk	Task No. 2
		File No. <u>21947</u>
Date 3/17/87	Date 3/18/87	Sheet of
HAUL ROADS THIS WO houl road in level B your Basea, an the level B Se to the finel road cons turn and a required to other fints a assistance stockpile are	RK will include supplied to a stockfille of maintaining the stock and place area place area from B tound such that dump efficiently. a more imaterial from the stockfile A Cat of a D-8 dozer will assumed average discontaction, where it will material, where it will	ping and transportation choice in the level ing the material in be constructed up and have Jend dumps can dozen will be the name area to 966 lowder with the 10ad trucks in the then hav! the fame of 1500 ft.
A motor grad	er will be used to maintain	used as spotters.

	TEK		D. HAWK	Task No. Z
,		GGG		File No. 21947
ate	3/17/87	Date	3/18/87	Sheet of
			;	
		- FTack	Bur i	
. (90)	MATERIAL COST	to stock	PICE .	
•		** ** ** ** ** ** ** ** ** ** ** ** **	The second section of the second section is a second section of the second section is a second section of the second section is a second section of the second section is a second section of the second section is a second section of the second section is a second section of the second section of the second section is a second section of the section of the secti	a destination and
	SUPPLIER -	MAT'L		ST HAULING TOTAL
	BRIVEMAN -	3/8" max.	-120 300	TON (FOR 10 mile Haci)
•	GOODWARD	Pit	Run	TON (FOR
	CONSTRUCTION		Run	10 mile Haul)
	25 .		1	
	COST PER	CCY		
			11 TON 7 1123	165 > 27 f 3 >
	(3	4 85/TON)	2000/60	$\frac{16s}{14d^3} = 50$
			(50,00)) (1493)
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- C	ose 0.2 min asses for 4 cy 8 18 cy Tv 0.2+4	30CKET ruck/3,	@ 90 6 cy/Lo. = 1.8	90 EFF. AD = 5 min to tance o	= 3.6 LOADS load to	cy/lo	with dozer	25.5
- C	OSE 0.2 min asses FOR 4 Cy E 18 Cy Tv 0.2+4 YCLE A SOO' 0-15	30CKET ruck/3,	@ 90 6 cy/Lo. = /.8 assisi B coo'	90 EFF. AD = 5 min to tance o	= 3.6 LOADS load to of one	cy/Lo	WOOD (WO	220
- C	OSE 0.2 min asses FOR 4 cy E 18 cy Tv 0.2+4 YCLE A 5001	30CKET ruck/3,	@ 90 6 Cy/Lo 6 Cy/Lo 7 Assist	90 EFF. AD = 5 min to tance o	= 3.6 LOADS load to	Cy/Lo	WOODE (WOODE) CYCLE MPTY YCLE	920
- C	0.2 + 4 YCLE A 500' 0-20	30CKET ruck /3.1 (0.4)	@ 90 6 cy/Lo. = 1.8	90 EFF. AD = 5 min to tance o	= 3.6 LOADS load find fore c soo' 20-0 eed	Cy/Lo	MPTY YCLE AVEL T	2
- C	OSE 0.2 min asses FOR 4 Cy E 18 Cy Tv 0.2+4 YCLE A SOO' 0-15	SUCKET FUCK /3.	@ 90 6 Cy/Lo 6 Cy/Lo 7 R 6 Cy/Lo 7 R 7 R 7 R 7 R 7 R 7 R 7 R 7 R 7 R 7 R	SO EFF. AD = 5 min to tance of ALY SP LOADED	= 3.6 LOADS load to f one C soo' S-0 20-0 peed EMPTY	Cy/Lo	MADED CYCLE MATT YOLE AVEL T	250
- C	OSE 0.2 min asses FOR 4 Cy 8 18 Cy Tv 0.2+4 YCLE A 500' 0-15 A 500' SECTION A	JENG	6 Cy/Lo. 6 Cy/Lo. 7 /8 7 /8 7 /8 7 /8 7 /8 7 /8 7 /8 7 /8	SO EFF. AD = 5 min to tance of ALY SP LOADED 7.5	= 3.6 LOADS load to f one C soo' 20-0 peed EMPTY	Cy/Lo	WITH OFFER AVEL TOED PO	5=
- C	0.2 + 4 YCLE A 500' 0-20	SUCKET FUCK /3.	6 Cy/Lo 6 Cy/Lo 7 (8 ASSIST B 500' 75 20 5TH	SO EFF. AD = 5 min to tance of ALY SP LOADED	= 3.6 LOADS load to f one C soo' S-0 20-0 peed EMPTY	Cy/LO LOA O.7 O.3	MADED CYCLE MATT YOLE AVEL T	5=

bject Tandfill	Construit	ton - feve	VB hand Kond		54P
TEK			D. HANNE	Task No. 2 File No. 21947	
			3/18/87	File No of	. —
te 3/17/8	7	Date	3/10/01	Sheet of	3
TOTAL	TRUCK CY	KIF			
1014	TROCK CI				
				0.5 minutes -	
	Assumed to 1 to 1	HAUL		1.8 minutes ~	
		RETURN		1.42 minutes	
		•	VER & DUMP	0.7 minutes >	
	•		Tomas average	6.32 minutes @ 10	
			TOTAL CYCLE	E JANUES & 10	Disetta?
HO. OF	TRUCKS				
		A =			
	EXCHAN	GE 4 LOAD		n + 0.5 = 2.3 min V	
	HEED				
		6.32 n	1.n. / 2.3 min =	2.75 TRUCKS V	
				3 Trucks	
manus even on the terminal		•	production		
			<i>∞</i> -	2.75 trucks	
ESTIN	TF PRO	DUCTION			
	1) AVG	-OND /crc	LE/ UNIT		
,		:	= 18 cy/unit	LOAD . 0.9 L.F. = 1	6.2 CCY/Jul
	2) cyci	ES PER HO	UR 60min	1 (6,32 min) = 9.49	cycles
	1		hr.	(.6.32 min) = 3.49	hr.
	3) Havriy	PRODUCTIO	ON RATE	and the second of the second o	
				A content of the cont	
<u> </u>	<u> </u>	(16.2 ccy/ load-	(9.49 Joad / un.t)	1537
	<u> </u>			1hr	- an
4	FIFET	PRODUCTIO	24	to the management and the second seco	
		To The Transfer of the Control of th	2.75 units	(153.7 ccy/un/4-hr.)=	= 423 CCY
					nr.
. 5) CHECK	DOZEIZ I	PRODUCTION	INDOCCY/	1123 CCY
:		1200 5	Thr x OHEC	1/cy = 1080 cc//hr. >	425 hr
		:			

Subject and Consta	tion - Leve	O Bhall Son	Const. Project No. 86 C 855 4 P
By TEK		D. HAWK	Task No. 2 File No. 21947
			File No. 21747
Date 3/17/87	Date	3/18/87	Sheet 5 of 5
()	PPON	u animatin i	FOR EFFICIENTY (45 min/60minhr)
		,	
againment on an annian an ann ann ann an annian aire an an an an an an an an		23 ccy/hr) (45	(min/60min) = 317 ccy/hr.
EQUIPMENT L	IST AND CO	STS	
			Q 12235 = \$211 50 /10 /
. 21	I CAT Y	ADED	$e^{123^{25}} = 246^{50} / HR$. $e^{7798} = 7798$
3)	3 18 CY EA	OD DUMP TRUCK	SE 5827 = 17481 - G 1276 = 2552 - 8 9264 = 9264 461745/AR
4) 5)	2 LABORI	ERS	@ 1276 = 2552 -
5)	1 CAT 14G L	NOTOR GRADER (9264 = 9261
1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	+·m	TOTAL COST	. 4617 12 /AR
COST TO HAU	L FROM .	STOCKPILE AND	PLACE
to a second of the second of t	name i i ar i i i		# 61745/10
			\$ 617 45/HR = \$195/ccy
			317 CCY
TOTAL COST FO	2 500014	M- AND PLACE	(A)C=
	<u> </u>		\$ 195/
			+\$ 805/600
A CONTRACTOR OF THE PARTY OF TH			\$ 1000 /ccy *
	COST _W/O	SAFETY EXCEPT	- 45/60 EFFICIENCY
	- Caramanan - Park - Caraman	1	
			S AND ADDRESS OF THE STREET
		and the same of th	
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	<u> </u>		***

• Haul Roads (Level D)

CREW AND PRODUCTIVITY WORKSHEET DATE PREPARED Per use of this form, see Thi 5-800-2: the presentnt opency is USACE. 3-18-87 PROJECT PREPARED BY CREW REF NO RMA T. KELLEY LOCATION CHECKED BY DENVER, CO 3/10/87 D. HAWK CREW COMPOSITION WORK TYPE WORK SCHEDULE SPECIAL INFORMATION HAUL ROADS -EXCANATION/PLACEMENT LEVEL D AREAS LABOR COST EQUIPMENT COST NO. TOTAL FOR CREW HOURLY. HOURLY CREW DESCRIPTION MECHANIED IN CREW TOTAL RATE (S/HR) RATE FOR CREW (S/HA) WHA! 3376 10637. 1688 21274. 2 CAT D-BL DOZER 1688 610 1688 6/10 1 966 LOADER CAT 5/27 4118 123 54 1709 3 18 CUBIC YARD END DUMP TRUCK 1703 7561 1703 7561 14 G MOTOR GRADER 2552 1276 2 LABORER 44 46 LABOR TOTALE EQUIPMENT MANHOURS COST CREW PRODUCTIVITY PRODUCTIVITY LABOR WORK TASK EQUIPMENT RATE UNIT/HR COMMENTS MH/UNIT SUNIT S/UNIT EXCAVATION 352 ccy/hr. 352 ccy/hr SAFETY MATERIALS DELIVERED TO STOCKPILE TOTAL EQUIPMENT, MITERIALS, LAROR, SAFETY

"Including frings benefits

DA FORM 8418-ft, Apr 85

For use o	CREW AND PRODUC If this form, see Tax 5-800	TIVITY WO	RKSHEET	IACE.	DATE PREPAR	18-87
PROJECT	•		THE PERSON NAMED IN	PREPARED BY		APRIL BOOK
LOCATION					KELLEY	
DENVE	R,CO .	•		CHECKED BY	K 3/18/87	7.
					2 3,0,0,	
			COMPOSITION			
WORKTYPE SAFETY	WORK SCHEDUL	B		SPECIAL INFORM	ATION HAUL	ROADS -
SACE I.	-	1		LEOR COST	LEVEL D	
CREW DED	COURTION	MG.	HOURLY	TOTAL	HOURLY	TOTAL
		IN CUEM	(SATE	FOR CREW	RATE	FOR CREW
						GEV PART
HEAVY EQUIP	MENT	7		_	495	3/15.
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TOTALE			LABOR		EQUIPMENT	2//5
·VIAG	MANHOURS		COST		COST	3/15/
		CREW PR	ODUCTIVITY			
WORK TASK	PRODUCTIVITY	L	NOR	EQUIPMENT	T T	
WORK TABE	NATE UNIT/HR	MH/UNIT	SUNIT	S/UNIT	COMM	ENTS
SAFETY	352 CY/HC			\$009/cm		•
	TO JAC			Cy		
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Including frings ponetics		l		<u> </u>	<u> </u>	
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Subj	ect <u>face</u>	Of No	struc	fin-	leve Dha	Olo Az	Project No.	C8554 P
	TEK	V			D. HAN		Task No. 2 File No. 2/9	
Date	3/17	187			3/18/87		Sheet/	of4
	(/4/)/	PCADE	-					
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	a	reas.					stockpi	
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		wid	00	spot	ters.	Lacore	a will	
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bject landice Cons	Checked By	D. HAWIC	_ Tasi File	No. <u>2/</u>	
te 3/17/87	Date	3/18/87	She		of4
Material Cos	ts to Stocky	rile			
(5	see level 1	B Laul Ke	rods)		
		mat.	l La	Mery	
		#305	=/Ton \$1 \ \(\frac{\pi}{2} \)	5 Ton	= 435/
	-+ Pa- CCY				
	st Per CCY	=*485 × 1	10 × 23 =	× 27 CF	= \$05/ec
LOAD CYCLE		10- Zo:	- CF	40-	
	= 1.8.0	in /truck	F== 15	- OKL 1.	ADFP
		COTTA ASS.	STANCE FR	car	- D-& DO
		(SEE le	vel B har	d none	5)
HAUL CYCLE			• •		
S00'	, so		c 500'	. 0	- 0
0-20			20-0	- loo	cyclic
500'		ග <u>'</u>	500'	- engi	t.
0-25			25-0	- T	v Cyrice
· · · · · · · · · · · · · · · · · · ·		an	g. speed	f Th	avel tu
Section	Length	Toaso	& Engl	ly tors	
B	_\$00' \$00'	70	72.5	0.5	7 / 0.45 8 / 0.25
	500	10	12.5	0.5	7-0.45
timo	= 500 (52	80' 60me	/m.) (5pec	Om/m)	= 5,68 Special(
TOTAL TRUCK CI	CLE				
		ge time	0.5 /	ninetes.	
	Haul		1.42		
	47-	ec 4 Duny)	0.7		

		Task No	1947
Date	3/13/87	Sheet 3	of4
	0		
xchangi e loo	d'ayale =	2.3 min (see &	evel B
sed 5.55	nenutas,		haul Kerls)
	2.3 m	m = 2.4/6	wehs "
	use <u>3</u>	trucks	
produc			trucks
	Olwer -1.	.;+	
18 64	× 0.9	= 16.2 ccy/	+ 1-0-
	الحدد به	La Bhand	20:4/5)
2) cycie	s perhan		
<i>U</i> .	(60 m	1. / 1 cycle 5.55 m	-)= 10.81 CM
3) Hand Br	inction Rate	,	
		() 110 at e-1	/ + \
	" (TOIL CEY/XO	hr.	145.1
4) fleet the		agili an ang ngaga sebasanggan sebesahan sebesah an an an an an an an an an an an an an	
(2	4/units)(175	1 ccy/hr-upit)	= 422 cc//r
A reason that a management of the second of		manuscription of the same approximation was	
5) Ouch do			y a water to thank
	1200 cy/hr. x	0.8 ccy/r = 96	ocy 5 422
6) production	n adjusted for	a efficiency	(50 ms/)
(#	elas ccyli VISC	mure/)-	= = coul
	Checked By Date Sechange a loo Exchange a loo Product Product Product 1) and loo 18 cy 2) cycle 3) Hours Ro. 4) fleet Ro. (2	Checked By D. How K Date 3/18/87 Sixcharge & lood ayale = Deed 5.55 minutes 12.3	Date 3/13/87 Sheet 3 Sheet 3

T. Killey		D. Have 3/18/87	Task No. 2 File No. 21947
ate 3/17/87	Date	3/10/01	Sheet 4 of 4
Equipment I	ist a 1 Com	te	
-			
	I cat D.	-& Pozers &	\$12325 = \$24650/m.v
2)	1 cat 96	6 toalor 6 \$	7729 = 7725 レ
3)	3 /8cy.	end dep true	KSE 582 - 17481
4)	2 faciries	5 @ 1276	LSC 5822 = 17481 V = 2552/M.
	1 cat 144	MOTOR CHRADERE	= # 72 -/1/
a vice transmission to the transmission to	-	Total Cost	\$61745/h.
		5:10 = 1 01	_
Cost To ha	ul tron 5+0	ck Pile and Place	2
		\$ 617.45	\$.175
g d Har Amangada a taga ta da		\$ 617.	n/25000/ = 1 -0
			352 1/hr.
_			
TOTAL COST F	OR SUPPLY I	ug and Placin	G
			# 275 /
and the second s	The distriction of the control of th	man is a many of state or least to the state of the state	\$ 175 /ccy ~
· · · · · · · · · · · · · · · · · · ·			\$ 175 /ccy - \$ 805 /ccy -
• • • •		TOTAL	# 175/ccy - # 8°5/ccy - # 1980/ccv * -
	1 s-late	TOTAL	#:980/ccy * ~
# Cost a	ulo safety	TOTAL	#:980/ccy * ~
* CCST C	v10 safety	TOTAL .50/60.	#:980/ccy * ~
# CCST C	v10 safety	TOTAL	#:980/ccy * ~
* Cest a	v10 safety	TOTAL	#:980/ccy * ~
	~10 safety	TOTAL	#:980/ccy * ~
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		TOTAL	#1980/ccy * - efficiency

DRAFT GUIDAUCE DOCUMENT FOR PECFORMING EXPEDITED RESPONSE ACTIONS (ERA'S) 11/27/85

COST FACTORS AS A PERCENTAGE

l.	Mobilization	•	
----	--------------	---	--

- ranges from 2 to 5% of total direct construction costs; use 5% for preliminary estimate

2. Contingency

 ranges from 15 to 25% of total construction cost; use 25% for preliminary estimate

3. Engineering

 ranges from 7 to 15% of total construction cost; use 15% for preliminary estimate

- 4. Legal and Administration
- ranges from 1 to 5% of total construction cost; use 5% for preliminary estimate

5. Protection Cost Factor

- see Table 1 for different percentage at various protection levels; use most conservative value for preliminary estimate

6. Equipment O&M Costs

- 3 to 5%/yr of equipment cost

7. Insurance Cost

- 1% of total capital cost

8. Equipment Replacement

- 1% per year of capital cost
- 9. Labor Fringe Benefits for O&M Costs
- 20 to 30% of wages
- 10. Start Up and Shake Down Cost
- 5 to 20% of total capital cost;
 use 20% for complex systems
- 11. Supervision and Administration during Construction
- 8% of estimated project cost -
- 12. Engineering and Design during Construction
- 15% of.estimated project cost

13. Change Order Contingency

- 15% of construction cost
- 14. Non-component costs associated with a site where an onsite treatment facility will be built from "scratch" (applied to total construction costs).
 - site preparation piping electrical instrumentation

- 1-10%
- 8-15%
- 5-12%
- 3-10%

A2-2

PEF: DRIFT GUIDANCE DOCUMENT FOR
TERFORMUL EXPEDITED RESPONSE
ACTIONS (ERA'S) 11/27/85

AVERAGE PERCENT INCREASE FOR TOTAL COSTS AT FOUR DEGREE-OF-HAZARD LEVELS

Enit Speretion	Level I	Level C	Level 8	Level A
hartaga water Controls:				•
. Seriece Seeline - Sythetic Memorane	1142	1192	1222	1241
2. Surface Seeling - Clay	1001	7191	1242	1272
1. Surface Seeling - Assault	-	499	-	·
4. Surface Sealing - Fly Ash	-	•••		60
S. Severetation	1175	1242	1261	1282
6. Contour Greates	1225	1338	1401	1463
7. Surface water Streetien Structures	1252	1448	1512	1548
E. Sesing and Ponds	1252	3382	1452	1503
f. Elber and forms	1904	1731	1762	1841
Ground Voter Controls:				
1. Well Paint System	1101	1171	1212	1282
2. Sees will System	-	66	440	649
2. Brein System	1287	1225	1632	1488
4. Injection System		-	-	949
S. Sentantte Slurry Trench	1092	3142	1223	1362
L. Grout Curtain	-		-	949
7. Sheet Piling Cutoff		-		
L. Grove Bottom Sealing	•	440		0.00
Ess Maration Controls:				
1. Factive Tranch Yeat-	***	•••	••	**
2. Passive Tranca Barriers	400 *	***	•••	-
1. Active Gis Estraction Systems	••	••	••	••
Weste Cantrols:				
1. Chancel Fluetton (Selldiffeation)	1223	1291	1332	1372
2. Chartes Injection	••	-		••
L. Cocavecion of Vertes/Contemineroe Sail	3075	3378	3978	7152
. Leachete fortreulerian	-		400	940
3. Treatment of Contominated Mater	1192	171%	1258	1782
6. Oran fracessing	2012	2282	2618	3175
7. Built font Processing	1958	2482	4198	3418
E. Transferry Processing	•••	2928	***	P

· Values given include 100 percent for base construction cods.

This unit operation was deemed appropriate for performance only at Level C. Coss at Levels D, B, and A were not provided.

Source: "Worker Health and Safety Considerations: Cost of Remedial Actions at Uncontrolled Hazardous Waste Sites", Draft Final Report, 1983. SCS Engineers for US EPA, Covington, KY

PROJECT RMA	3-60-2	. Und grapheria	· ·	3-18	-8 T		٥, ۶
LOCATION							
DEN.	VER					·	
	•	ESTMATO	T. Kelley	,	CHECKED	HAWK	
Item descr.	1984 14just	Region	Blue Book	Hourly Ro	teroperation	y Almy Coll Operator	PS TOTA (\$/HR.
TRUCK!) -03.	Korres	DIAK.
-Rear Dump				1			
- ON/OFF HIGHWAY							
- 375 HP Diese /							
- 18c.Y.	.901	1.05	\$4130°	2258	1800	1709	58 ²³
TRUCK:	_						
- REAR DUMP							
- 300 H.P.							
- 12 C.Y.	.901	1.05	389500	2130	1600	16 78	5408
DOTER;						-	
-CAT DBL	.91	1.05	1279000	7064	3210		
- Straight blode							
- Angle Tilt	.90	1.05	\$ 17000	0 93	020		
-Cushion	.90	1.05	₹3855	210	040		
-Total			·	7367	3270	16 88	12325
DOZER:				·			-
-CAT D6	.91	1.05	5920=	32₹	1370	1688	6328
SCRAPER:						•	
-CAT 627B	.887	1.05	14000000	7537	4240	1703	134 80
OMPACTOR:							
-CAT825C							
straight blade	.880	1.05	11,780	6222	2760	1688	10740
HATER TANKER:							
-10,00000	÷						
-450 H.P.	.883	1.05	15,5750	8347	3555	1709	136"

PROJECT			-				
R. MA							
DENUER,	,00						
PLAN NO.	•	ESTIMATOR	7 L		CHECKED BY		
	11984	Rey.on	T. Kelizy	reurly Ratz	10,00	HALK CORPS	
Item descr.	Adjust	Adjust	Monthly Rental	(173 W./mc)) Cost	operator Rates	5/hr.)
MOTOZ CHRADEZ:							
-CAT 14G	.884	1.05	83/0°0	4459	186 <u>5</u>		
- Black Control	-882		151500	8"	175		
- 14' width	-882	1.05	38500	206	045		
- TOTAL				5476	२० <i>६</i> ड	1703	102 LE
LONDER!							
-CAT 966C	.891	105	7490™	4C 5=	يوه ي	16 ==	272
BACKHOE:			-				
-CAT 245	.843	1.05	19695력	10072	4/30	1703	15919
TRACTOR:			-				
- p7RS 1-100S	.827	105	94055	50 <u>06</u>	3 c 3 <u>s</u>	1683	9729
- DISC ATTACH	.877		40. €	2/3	_ S <u>S</u>	0	9729 262
-TOAL							9995
ABOZER:						1276	1276
						12	1,0
						•	
	4						
	\bot						
	+						
	+						
	+		1				
						1	i

Subject WAGE PATES	FOR RMA	Pro	eject No. <u>& C</u>	8554 P	
By D. Hawk Checked By T. Kelly		Tas	Task No. 2		
		File	No. 2/9	747	
Date 2/12/87	Date 6/7,6/87	She	eet/	of_3_	
WAGE RATES F	DR COST ESTIMATING				
	- WAGE DECISION NO	:	:		
TZS,		,	LORADO		
BASIN F	IS IN SECTION 26				
PAINTE LABOR POWER OFFE	RICIANS - AREA I RES - AREA I ER - GROUP I ? : Equipment - Zone I	2	· · · · · · · · · · · · · · · · · · ·		
TRUCK	Delvers - Zone 2				
			, i		
Correctory	Work Descention	WAGE	FELNUE	TOTAL	
) ELECTRICIANS	CABLE SPLKERS	16.85	2.10+33%		
2) Carrowers	ALL	13.90	3.22	17.12	
3) Comput Masons	ALL	12.40	3.79	_ 16,19	
4) Ieruana	Acc	16.00	<i>3.</i> 53	or other to be because of	
5) LASORUTES	@ BAGGERS	722	2.24	946	
and the same advances and the same	Or Minumum Labor	בצימו	2.24	1275	
	Fence Drectors Seeding State Chase		<u> </u>		
	TIE BAR & CHAIRS IN				
	concrete, pailing,			81	
	O Hydraulic & Electrical Foot Torches, duils, temper		2.24	12-	
	jack hammers form solle	2	ا به سنده دادی ایا ایا در در از از از دادی است کند است.		
	concrete sous, esphalt les	n,	;		
	pipelaner condit pump	F - C HERFINGS &			
	*		-		

Subje	ct WAGE RATE	K FOR RMA		Project No. 80	C85547
Bv -	D. Hawk	Charked By T V. On		Task No	
-,		Checked By TKU		File No. 2	947
Date	2/12/87	Date 6/16/97		Sheet 2	•
•				:	
	CATEGORY	WORK DESCRIPTION	WAGE	FRUSEF	TOTAL
			•		
6	Power Equipment	O Air Compression,	12.41	3.77	16.18
	CHERAFORS	Mechanic, Welder	•		
•		Light plants,			
1		Single mit conveyor	ŧ		
	Marie 2 44 1 A	Pumps, Troctor	•		
		under 70 HP			
1		±360CPM Congressor	. 12 7/	2	11 -3
1		ateulls, trenches	12.76	3.77	16.53
1		Pigmilly Self propoled			
İ	•	roller, nubber Hord	•		
		under 5 tons			
		3 Asphalo Plant.	13.11	317	16.88
		Concrete batching,			
	•	Finish Machines	:		
	·	PAVING, HOIST Idrum,			
		Hydraulic backhoes			
		under 3/4 oy, Loader			
	•	(rough), rollon over			
1		5 10 10 10 10 10 va	•		
		tractor			
	• . •	(4) Grane and backlus	13.24	3.77	17.03
	* * .	5 Cy and under			
	in the production of the	Hydralic Hoe 3/4 cy			
7		and ever border	•••		:
		over Gody, Mechanic	1	•	* . *
•	e et a danse des set et a la la g	Finish motor grader	4	•	-
		Multiple Unit Cruster Scraper & 40 Cy			;
	a comment of the comm	Welder	en era da junta i santa para i i i i i i i i i i i i i i i i i i	the temperature of a second	A
		(5) Heavy-duty meckenic	13.41	3.77	17.18
		wilder Scraper >			
1		40 04			
	ير بر موسد موسد الم				
			• .		
		- :			
	•			τ -	

Subject <u>Wage Rati</u> Sy D. Hawk	Checked By	T. Kell	Tasi	ect No. <u>86</u> (No	2
Date 2/12/37	Date	6/26/	J _	et5	
CATEGORY	Work Des	CRIPTION	WAGE	FRINCE	TOTAL
1) TRUCK Deive	Delver T	enones,	12.88	3.64	16.57
: 	Truck Driver Driver Blat bed Shottle tr	single sure	13.01	3,64	16.65
	3 Flat me		13.14	3.64	16.78
	aules in	echanics Jump 670 Mc4			

(6) Cement Mires to 10 CY

1 Dump truck > Mey

Multi-purpose > Hoist

but < 27 ey, semi liquid tenter, buk

1 Trick diver, sow plow

1 Tire man, dump truck

1 Cerest Mixer > 15 CY

Heavy Duty diesel

mechanic, body mon

Highbery , Lowbory , SETTI

39 to 54 cy

welders

Comput mixer 10 to 1504

Damp trick 29 to 39cy

13.33

13.38

13.45

13.58

13.64

13.75

14.0L.

14.06

14:13

15.51

15.76

3.64

3.64

364

364

364

3.64

3.64

364

3,64

3.64

16.97

17.02

17.09

17.22

17.28

17.40

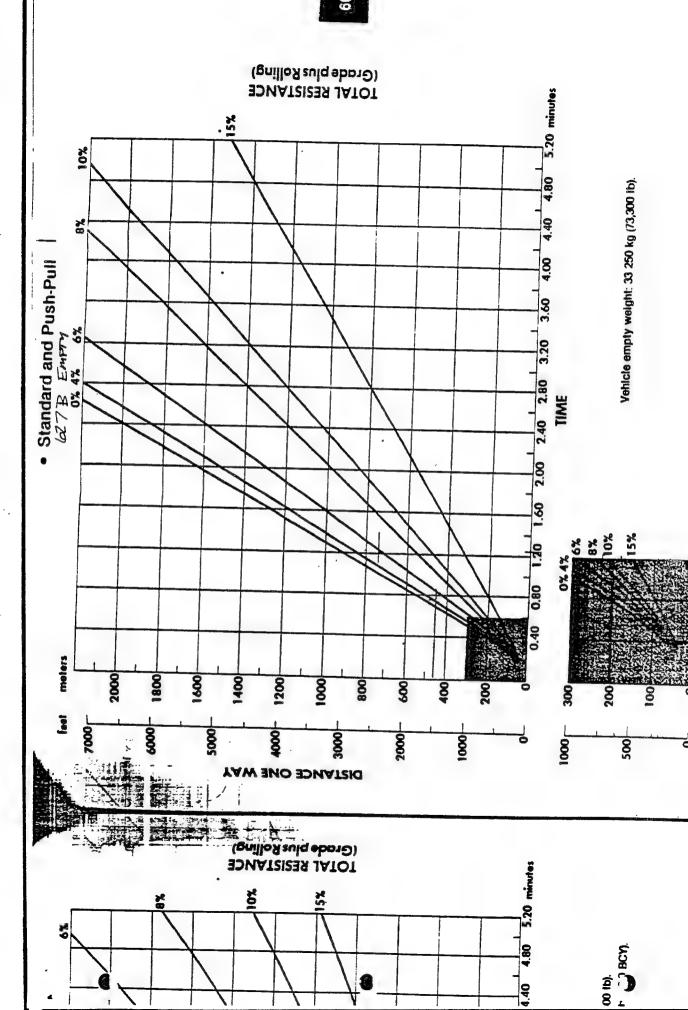
17,45

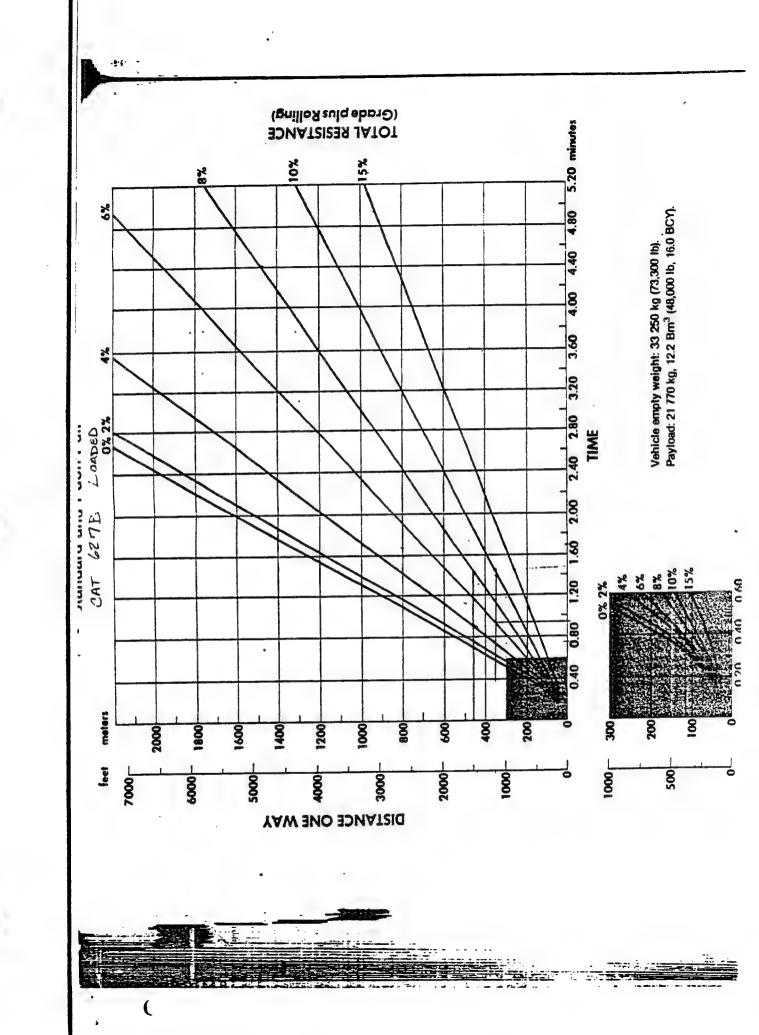
17.70

17.77

11.15

19.40





Subject HEALTH AND SAFETY COSTS	Project No. <u>86 C8 55 YF</u>
By D. HAWK Checked By T. KELLEY	Task No. 2 File No. 2/947
Date 3/17/87 Date 3/18/87	Sheet of
DIRECT HEALTH AND SAFETY COSTS	1 -
D CAT 627 B SCRAPER & OPERATE	L CHEAVY EQUIPMENT
a) Enclosed CAB (RANGE 2405.	-65%)= 425°/mo
b) Air Conditioner	2 150 mo
d) Protective Clother I change	100 pm 3085 mo
c) Dress/DERON 2 hr/day 61	7 = 875 /mo
f) 14 Standing Operator @017 =>	me = 1095=/mo
TOTAL MONTH	
707=L 3 1047 H	Eq = :20. 2/Mb.
One time costs	
a) Brackets for cylinder	s = "500 ee
b) Airline System	= 400 00
c) Communication System (2)	944) = 200.00
d) First Aid Kit	25 25
e) Fire Extinguisher 1) Level 8 training	= 15000
a) Thy sical (2) & 450%	fer = \$900 50
<i>y</i> ,	*
TOTAL	1-TIME = \$351500
	6m0 = \$595/mo.
	restriction of the contraction design of the contraction of the contra
TOTAL MONTHLY COST CAT	627 B SAFETY = 4610 =
Assume 173 He /no Ton	THE MORELY LOST = 20 TH
	: 1 1 1
+ Average cab cost used for this	cost 240+605=342
Scrapers @ low end 24000 Dozbrs @ high and 6005	/ea - 6278
Does a think and and	-144- 00

Subject	CAPETY LASIS	Project No. <u>84 6 85 5 9 F</u>
BY D HAWK	Checked By TKELLE!	Task No.
4		File No 21947
Date 3/17/87	Date 3/18/87	Sheet of
27.701	3, 2,07	
DEACH WITE LASE FOR WAS CHA	LARDRATE WILL BE CONTROLS WILL BE COPY OF STREETS WILL BE REQUESTED TO AND FROM POST WILL CHARLES OF DISPOSMENT OF PROTECTIVE CLOPMES OF DISPOSMENT OF DISPOSMENT OF DISPOSMENT OF DISPOSMENT OF SCHOOLS OF DISPOSMENT OF SCHOOLS OF SC	5. AROUT 1.3 BACK-OP 1.200 IN ROTATING. THIS WILL ALLOW 3.0 MINUTES OFF - 15 MIN - /2 AROCER. FINE 3.4300 = 430/044 - 15310/044 - 15310/044 - 15310/044 - 15310/044 - 15310/044
	TAL HOURLY COSTS	250 00 = 3750 00 x 2.5 = 2750 00 x 2.5 = 10,050 x 2.5 = 1675/mo.
where	ote: This labor Change air lines are improved of depend on laborer	cal and production.

Subje	ect HEALTH KAD SAF	etycoss - stand:	EQUIPMENT Project No	<u>86C85547</u>
Ву	T. KELLEY	Checked By D Han	Task No	
	. (21947
Date	3/18/87	Date 3/18/87	Sheet	of
	NON-OPERATIO	HAL HEALTH AND	SAFETY COST FOR	STAND BY EQUIPMENT
	DOUGOING	RENTAL.	: 	****
		a) Enclosed Cab (Range 240 = -605 /mo) = \$425 \(\frac{\pi}{mo}\)
		b) Air Conditioner		= \$150° /mo
	Andrew Control of the		TOTAL MONTHLY	\$ 575 ma
		- ,	7	
	<u>.</u>	·		
	2) ONE TIME	CD\$73		
	·	a) Brackets For b) Airline Syste c) Communication d) First Aid Kit a) Fire Extinguis	en on System (Light)	# 400° # 25°° # 25°° # 40°
			TOTAL /-Time ASSUME FOR 6 MO.	\$ 1,165° /mo
	Tor	IL MONTHLY STAN	DBY EQUIPMENT -	305
			SAFETY C	OST=# 769 /m
	Assu	MING 173 HR/mo,	STANDBY HOURLY =	# 444/48
			<u></u> S	24 #45 /HR.
- - -				· · · · · -
			-	
		and the community of the same		
		and the second of the second o		
-				
		was and an an analysis statements are set of the set of		

DATE: 3/19/37 TIME: 2:50 PM	TELEPHONE MEMORANDUM	PROJECT NO. 8608554P
(TO) (FROM) MR. BO COMPANY TVISTE RECORDED BY DAN	CONSTRUCTION CO.	ROUTING DURO
PROJECT RM4.	•	FILE 21947 T2
- Julian	•	
Foe	monthey part 2100 /m	onth machine lineles 1 as
	CAT 966 CAT 235 CAT D6	4 - 1
4) Bres	thing Device Brackets	
- h	edigible operating cost	Premium
mon	to risk involved. (higher than expects the quaranteed sented e refined (less contin	the price will
· is a	at considered short ter	

RECORD OF VERBAL QUOTE

Próje	ect: Name: Rocky Mt. Location: Degree		
Quot	#: MISC. (Estimate		
Firm		ety + Supply	70000-
	Telephone No.: (303)		
	Person Talked To: Roy		
Type	of Quote: Supplier, ma		nt:)
	Subcontracto	r, material installed	d (Cost to Prime)
Scope	/Description/Amount of Quot	e:	
	5 minute escupe pack mask, 5 min. both belt, pigtail	4612 Le	
	Airline	\$ 164.30	for 100A \$105 for 50F
	piqtuil	\$13.402	ach
Toran AIRLINE &	T's	4	\$14.50 emh
~ 400 -	Regulator w 6 Her	#145	wo filter \$105
	Alum (4500 psi ince	\$93	
`	Microphone	·	
	Loud mouth (throut m	(c) \$198	
	Throut mic w/ rudio and head set (8	hensnifer \$1840 wmwk)	
	Survivair 60 min		795 list price
	30min () 186)		•
Date	Quote Received:		
Quote	Received By:		

RECORD OF VERBAL QUOTE

Project: Name: Rocky Mtn. Arsenal Location: Denver
Quote #: 2 m/SC. (Estimate Sht. No)
Firm: Name: Air Products
Location: Denver
Telephone No.: (303) 329-9353
Person Talked To: Dan Literas
•
Type of Quote: X Supplier, material only (FOB Point: RMA)
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
They truck in all their air form Kansas.
And continue to some size in Dear of their facilities
Not certified to pump air in Denver from their facility
\$ 15/cylinder
no delivery or pick-up charge \$3.95 charge per cylinder if keep past the end of the month
the or almost new culinder if keep past
#3.43 Enarge per square
the end of the month
·

Date Quote Received:	317/87
Quote Received By:	Kisaderhart

RECORD OF VERBAL QUOTE

RECORD OF VERBAL QUOIE
Project: Name: RMA Location: Denour CO
Quote #: 3 m/SC. (Estimate Sht. No)
Firm: Name: Air Products
Location: Donver
Telephone No.: (303) 329-9353
Person Talked To: Dan
Type of Quote: X Supplier, material only (FOB Point:)
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
New quote:
If they are looking at 30-40 cylinders a day they will get certified to pump air in Denver They will charge \$8.50 cylinder
they will get certified to pump air in Denver
They will charge \$8.50 cylinder
\$3.00 per cylinder for every cylinder Kept past the month.
cultivator hip fees
the end of

Date Qu	ote Rece	ived:	3/a	0/87	
Quote I	Received	Ву:	Disa	Herhar	+

•